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Environmental Protection
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The 2011 Annual Effluent Guidelines Review Report

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Office of Water (4303T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

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1. BACKGROUND

This document supports EPA's Office of Water's *Preliminary 2012 Effluent Guidelines Program Plan* (Preliminary 2012 Plan) (U.S. EPA, 2013). The Preliminary 2012 Plan provides background on the CWA, the ELG planning process and review methodology and presents the results of the 2011 Annual Reviews. This document details how EPA used reported discharge data from the Toxic Release Inventory (TRI) and discharge monitoring reports (DMRs) to create databases and estimate the toxicity of industrial discharges.

EPA is responsible for developing the programs and tools authorized under the Clean Water Act (CWA), which enables EPA and the states to protect and restore the Nation's waters. These programs and tools generally rely either on water-quality-based controls, such as water quality standards and water-quality-based effluent limitations, or technology-based controls, such as effluent guidelines and technology-based effluent limitations. In addition to developing new regulations, the CWA requires EPA to review existing effluent guidelines annually. EPA reviews all point source categories subject to existing effluent guidelines and pretreatment standards to identify potential candidates for revision, consistent with CWA sections 304(b), 301(d), 304(g), and 307(b).

EPA has established ELGs to regulate wastewater discharges from 57 point source categories and annually reviews the ELGs for these categories. EPA first conducts a toxicity rankings analysis of all categories subject to existing ELGs to prioritize the categories for further review. The Agency may then conduct another review, either an in-depth "preliminary or detailed study" or a somewhat less detailed "preliminary category review," to identify existing categories for potential ELGs revision.

Based on its toxicity rankings analysis, EPA was able to prioritize for further review (i.e., a preliminary or detailed study or preliminary category review) those industrial categories whose pollutant discharges potentially pose the greatest hazards to human health or the environment because of their toxicity (i.e., categories that collectively discharge over 95 percent of the total TWPE). Table 1-1 presents the 19 industrial categories that EPA recently identified for preliminary category review and one industrial category, Plastics Molding and Forming (40 CFR Part 463), for a preliminary study. Sections 3 through 21 of this report provide the details of EPA's review and conclusions for the top ranking industrial categories.

Table 1-1. Point Source Categories Collectively Discharging Over 95% of the Total TWPE

40 CFR Part	Point Source Category	Total TWPE	Cumulative Percentage of Total TWPE	Rank
430	Pulp, paper and paperboard	1,240,000	20.4%	1
418	Fertilizer manufacturing	912,000	35.5%	2
419	Petroleum refining	731,000	47.5%	3
414	Organic chemicals, plastics and synthetic fibers	687,000	58.8%	4
433	Metal finishing	283,000	63.5%	5
435	Oil & gas extraction[a]	238,000	67.4%	6
420	Iron and steel manufacturing	230,000	71.2%	7

Table 1-1. Point Source Categories Collectively Discharging Over 95% of the Total TWPE

40 CFR Part	Point Source Category	Total TWPE	Cumulative Percentage of Total TWPE	Rank
445	Landfills	222,000	74.8%	8
421	Nonferrous metals manufacturing	215,000	78.4%	9
440	Ore mining and dressing	208,000	81.8%	10
463	Plastics molding and forming	177,000	84.7%	11
415	Inorganic chemicals manufacturing	124,000	86.8%	12
429	Timber products processing	121,000	88.8%	13
436	Mineral mining and processing	85,500	90.2%	14
432	Meat and poultry products	71,000	91.3%	15
434	Coal mining	66,800	92.4%	16
437	Centralized waste treatment	51,000	93.3%	17
455	Pesticide chemicals	45,700	94.0%	18
467	Aluminum forming	39,700	94.7%	19
410	Textile mills	39,100	95.3%	20
	Total	**6,070,000**[b]		

[a] The 2011 preliminary category review did not include the review of the shale gas extraction or coalbed methane sectors as they are currently under review by EPA. See 76 FR 66286 (October 26, 2011) (although EPA is proposing to delist from rulemaking the coalbed methane extraction subcategory from the effluent guidelines plan).

[b] Total industry TWPE is the sum of the combined 2009 TWPE for all point source categories, not just the top 95 percent.

1.1 Background References

1. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

2. PUBLIC COMMENTS ON THE FINAL 2010 EFFLUENT GUIDELINES PROGRAM PLAN

EPA published its Final 2010 Effluent Guidelines Program Plan (Final 2010 Plan) on October 26, 2011 (76 FRN 27742) and requested comments on various aspects of its analyses, data, and information to inform its 2011 annual review and one detailed study. The Agency received 31 sets of comments on the Final 2010 Plan. The comment period closed November 25, 2011 but was extended until February 27, 2012 after EPA received four requests for extension. Table 2-1 lists the commenters as well as a synopsis of the comments.

Table 2-1. Comments on the Final 2010 Effluent Guidelines Program Plan EPA Docket Number: EPA-HQ-OW-2008-0517

No.	Commenter Name	EPA Docket No.	Comment Summary
1	Graham Brannin (City of Tulsa, OK)	0817	Supports dental amalgam best management practices (BMPs) only, does not support numerical limits or clarification of dental offices as standard industrial users (SIUs); opposes traditional effluent guidelines to regulate discharges of unused pharmaceuticals.
2	Rosalind Volpe (Silver Nanotechnology Working Group (SNWG))	0819	Recommends collaborating with the EPA Office of Pesticides Programs (OPP) for information on nanosilver.
3	Barry Russell (Independent Petroleum Association of America (IPAA) et. Al)	0820	Requests a 60-day comment period extension.
4	Dennis Lathem (Coalbed Methane Association of Alabama)	0821	Requests a 60-day comment period extension.
5	Jonathan Bridges (Littleton/Englewood Wastewater Treatment Plant)	0822	Recommends reconsidering moving forward with National Dental Amalgam regulations, stating that standards should apply only to publicly owned treatment works (POTWs) that discharge to mercury-impaired receiving waters. Notes that state and local programs already exist and it is it unnecessary to change the regulations.
6	Roger Claff (American Petroleum Institute (API))	0823	Supports moving forward with an ELG for CBM but urges EPA to investigate non-water quality impacts of treatment technologies and maintain collaboration with industry stakeholders. Supports moving forward with SGE pretreatment standards but recommends maintaining collaboration with industry stakeholders.
7	David Snyder (Los Angeles County Sanitation Districts)	0824	Supports dental amalgam BMPs because the cost of regulating dental amalgam would be high. Recommends EPA take a leading role in convening a volunteer National Amalgam Separator Review Committee.
8	Terrie Mitchell (Sacramento Regional County Sanitation District)	0825	Supports dental amalgam BMPs only to minimize POTW burden, stating standards should apply only to POTWs that discharge to mercury-impaired receiving waters. Provided additional information on dental amalgam discharges.
9	Luther Strange (State of Alabama Office of the Attorney General)	0826	Requests a 60-day comment period extension.
10	Robert Aderhold (Congress of the United States, House of Representatives)	0827	Requests a 60-day comment period extension.

Table 2-1. Comments on the Final 2010 Effluent Guidelines Program Plan EPA Docket Number: EPA-HQ-OW-2008-0517

No.	Commenter Name	EPA Docket No.	Comment Summary
11	Peter Berglund (Metropolitan Council Environmental Services)	0828	Recommends that EPA take a leading role in convening a volunteer National Amalgam Separator Review Committee. Provided data supporting the National Review of Amalgam Separators.
12	Kathryn Klaber (Marcellus Shale Coalition (MSC))	0829	Opposes moving forward with ELGs for SGE.
13	Cynthia A. Finley (National Association of Clean Water Agencies (NACWA))	0830	Supports dental amalgam BMPs, does not support numerical limits or clarification of dental offices as SIUs; supports moving forward with an ELG for nanosilver manufacturing because EPA needs to address the problem of nanosilver and silver discharges from domestic sources; supports moving forward with an ELGs for SGE as long as the standards are scientifically and economically sound.
14	J. Dillard	0831	Recommends EPA examine electric vehicle batter manufacturing and landfills for unregulated discharges.
15	Pete Miller (Range Resources)	0832	Opposes moving forward with the ELGs for CBM because the wastewater is mostly recycled or reused. Opposes moving forward with ELGs and pretreatment standards for SGE because current regulations and treatment methods are sufficient and the majority of wastewater is recycled and reused.
16	Lee Fuller (Independent Petroleum Association of America (IPAA))	0833	Opposes moving forward with ELGs for CBM because CBM wastewaters are already regulated and an ELG is inflexible and does not account for future technological improvement. Opposes moving forward with ELGs for SGE due to the high variability of the wastewater.
17	Eric Uram (Coalition for SafeMinds)	0834	Supports ELGs for ethyl mercury specifically, particularly for the pharmaceutical manufacturing industry.
18	John V. Corra (Wyoming Department of Environmental Quality)	0835	Supports moving forward with ELGs for SGE. Opposes moving forward with ELGs for CBM because the ELG is inflexible and does not account for future technological improvement and CBM wastewaters are beneficially used in agricultural applications.
19	John Pastor (Southern California Alliance of Publicly Owned Treatment Works (SCAP))	0836	Supports dental amalgam BMPs, states that standards should apply only to POTWs that discharge to mercury-impaired receiving waters.
20	Don M. Nevin (LAMNIpipe Inc.)	0837	Provided data on technology solutions for treating naturally occurring radioactive material (NORM) in SGE produced water.
21	Christopher T. Hall (Metropolitan Sewer District of Greater Cincinnati)	0838	Supports moving forward with ELGs for CBM and SGE. Supports dental amalgam BMPs, does not support numerical limits or clarification of dental offices as SIUs.

Table 2-1. Comments on the Final 2010 Effluent Guidelines Program Plan EPA Docket Number: EPA-HQ-OW-2008-0517

No.	Commenter Name	EPA Docket No.	Comment Summary
22	Patrick O'Neil (Geological Survey of Alabama)	0846	Provided detailed comments on the CBM Detailed Study Report.
23	Suzanne Wienke (Los Angeles County Sanitation Districts)	0847	Recommends EPA look into nanosilver and silver discharges from domestic sources. Opposes ELGs for nanosilver because local limits are sufficient.
24	John Downs (Cabot Specialty Fluids Limited)	0848	Recommends EPA consider recognizing formate brines as a unique class of green chemistry fluids and improve the hazard assessment technique so that it is sufficiently discriminating.
25	Rebecca Hammer (Natural Resources Defense Council et al.)	0849	Recommends that pretreatment standards should be developed for all oil and gas wastewaters. Supports moving forward with ELGs for SGE because POTWs alone cannot sufficiently treat SGE wastewater. States that if SGE discharges to POTWs are allowed, the pretreatment standards should be set as stringently as possible. Recommends that ELGs for Centralized Waste Treatment facilities should be updated in order to address SGE wastewater.
26	Rayza Santiago (University of Pittsburgh Environmental Law Clinic on behalf of Clean Water Action)	0850	Supports moving forward with ELGs for CBM and urges EPA to advance the timeline for the proposal of ELGs for CBM because treatment technologies are available. Commenter provided additional data on SGE and CBM treatment technologies.
27	Walter Baker (Association of Clean Water Administrators (ACWA))	0851	Supports moving forward with ELGs for CBM. Recommends EPA develop ELGs for emerging pollutants, study the effects of all nanoparticles on the environment, reexamine the metal finishing category due to significant changes in the industry over the last few years, continue study of proper pharmaceutical disposal, and look into electric vehicle batter manufacturing wastewater discharges. Also recommends that EPA should not shift away from technology-based regulations because total reliance on water quality standards is not effective.
28	Rob Beranek (Cliffs Natural Resources Inc.)	0852	Provides comments on the Ore Mining Preliminary Study.
29	Dennis Lathem (Coalbed Methane Association of Alabama (CMAA))	0853	Opposes moving forward with ELGs for CBM because CBM wastewaters are highly variable and ELGs are not flexible.
30	Amanda E. Aspatore (National Mining Association (NMA))	0854	Supports EPA's decision not to move forward with revision to the Ore Mining ELGs. States that the data in the Ore Mining Preliminary Study is outdated, faulty, and misused.
31	Robert J. Lenney (Reynolds Metals Company, subsidiary of Alcoa, Inc.)	0855	Provided a petition to revise the Nonferrous Metals Manufacturing Potline SO2 Wet Air Pollution Control Subcategory.

3. METHODOLOGY, DATA SOURCES, AND LIMITATIONS

EPA reviewed effluent discharge data to fulfill its Clean Water Act obligations, generating the preliminary rankings shown in Table 1-1. The Clean Water Act (CWA) requires EPA to conduct an annual review of existing effluent limitations guidelines and pretreatment standards (ELGs) (U.S. EPA, 2013). It also requires EPA to identify industrial categories without applicable ELGs. EPA's methodology for the 2011 Annual Reviews and new point source category identification involves several components, as discussed the Preliminary 2012 Plan (U.S. EPA, 2013). This report discusses the toxicity rankings analysis and further review of point source categories subject to existing ELGs.

First, EPA performs a toxicity rankings analysis of all point source categories subject to existing ELGs to identify categories discharging high levels of toxic and nonconventional pollutants relative to other categories. Second, EPA identifies priority categories as possible candidate ELGs for revision, consistent with CWA sections 304(b), 301(d), 304(g), and 307(b). EPA then performs further review of the priority categories. Section 4 of the Preliminary 2012 Plan discusses the findings of EPA's 2011 Annual Reviews (U.S. EPA, 2013). Sections 3 through 21 of this report provide more details on the individual category reviews and their conclusions.

In performing the toxicity rankings analysis of existing ELGs, EPA generates databases to evaluate discharge monitoring report (DMR) data, contained in EPA's Permit Compliance System (PCS) and the Integrated Compliance Information System for the National Pollutant Discharge Elimination System (ICIS-NPDES), and the Toxics Release Inventory (TRI). This section discusses these databases, related data sources, and their limitations.

EPA developed two toxicity rankings analysis tools, the *TRIReleases* and *DMRLoads* databases, to facilitate analysis of TRI and PCS/ICIS-NPDES data. EPA previously explained the creation of these toxicity rankings analysis tools in the *Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories* (2009 Screening-Level Analysis (SLA) Report) (U.S. EPA, 2009). The 2009 SLA Report provides the detailed methodology used to process thousands of data records and generate national estimates of industrial effluent discharges. This section does not revisit the details of creating the database tools. Instead, it lists the methodology corrections made to the *DMRLoads* and *TRIReleases* databases as part of EPA's 2011 Annual Reviews.

3.1 Data Sources and Limitations

This subsection provides general information on the use of Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes, toxic weighting factors (TWFs), TRI data, and DMR data. The following reports supplement this section and discuss EPA's methodology for developing and using the two toxicity rankings analysis tools:

- Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories, (2009 SLA Report) (U.S. EPA, 2009). Documents the methodology and development of the DMRLoads2009 and TRIReleases2009 databases, including (but not limited to) matching NAICS and SIC codes to point source categories and using TWFs to estimate toxic-weighted pound equivalents (TWPE).

- *Draft Toxic Weighting Factor Development in Support of the CWA 304(m) Planning Process* (Draft TWF Development Document), dated July 2005 (U.S. EPA, 2005). Explains how EPA developed the December 2004 TWFs.

- *Toxic Weighting Factor Development in Support of the CWA 304(m) Planning Process* (Final TWF Development Document) (U.S. EPA, 2006b). Explains how EPA developed the April 2006 TWFs.

3.1.1 SIC Codes

The SIC code system was developed to help with the collection, aggregation, presentation, and analysis of data from the U.S. economy (OMB, 1987). The different parts of the SIC code signify the following:

- The first two digits represent the major industry group;

- The third digit represents the industry group; and

- The fourth digit represents the industry.

For example, major SIC code 26: Paper and Allied Products includes all pulp, paper, and paperboard manufacturing operations. Within SIC code 26, the three-digit SIC codes are used to distinguish the type of facility: 263 for paperboard mills, 265 for paperboard containers and boxes, etc. Within SIC code 265, the four-digit SIC codes are used to separate facilities by product type: 2652 for setup paperboard boxes, 2653 for corrugated and solid fiber boxes, etc.

The SIC system is used by many government agencies, including EPA, to promote data comparability. In the SIC system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one SIC code. Some data collection organizations track only the primary SIC code for each establishment. PCS and ICIS-NPDES include one four-digit SIC code, reflecting the principal activity causing the discharge at each facility.

Regulations for an individual point source category may apply to one SIC code, multiple SIC codes, or a portion of the facilities in an SIC code. Therefore, to use databases that identify facilities by SIC code, EPA linked each four-digit SIC code to an appropriate point source category, as summarized in the "SIC/Point Source Category Crosswalk" table (Table A-1 in Appendix A).

There are some SIC codes for which EPA has not established national ELGs. Table A-2 in Appendix A lists the SIC codes for which facility discharge data are available in PCS and ICIS-NPDES, but for which EPA could not identify an applicable point source category. For a more detailed discussion, see Section 6 of the 2009 SLA Report (U.S. EPA, 2009).

3.1.2 NAICS Codes

In 1997, the U.S. Census Bureau introduced the NAICS code system, to better represent the economic structure of countries participating in the North American Free Trade Agreement and to respond to criticism about the SIC code system. Table 3-1 explains the nomenclature and format of NAICS and SIC codes.

Table 3-1. Nomenclature and Format of NAICS and SIC Codes

NAICS		SIC	
2-digit	Sector	Letter	Division
3-digit	Subsector	2-digit	Major Group
4-digit	Industry Group	3-digit	Industry Group
5-digit	NAICS Industry	4-digit	Industry
6-digit	U.S. Industry	N/A	N/A

For example, below are the SIC and NAICS code for the Folding Paperboard Box Manufacturing industry.

In the SIC code system the classification is less stratified:

- 26: Paper and Allied Paper Products;
  - 265: Paperboard containers and boxes;
    - 2657: Folding Paperboard Boxes, Including Sanitary (except paperboard backs for blister or skin packages).

In the NAICS code system the classification is more stratified:

- 32: Manufacturing;
  - 322: Paper Manufacturing;
    - 3222: Converted Paper Product Manufacturing;
- 322212: Folding Paperboard Box Manufacturing.

The NAICS system is used for industrial classification purposes at many government agencies, including EPA. As in the SIC system, each establishment is classified according to its primary economic activity, which is determined by its principal product or group of products. An establishment may have activities in more than one NAICS code.

Regulations for an individual point source category may apply to one NAICS code, multiple NAICS codes, or a portion of the facilities in an NAICS code. Therefore, to use databases that identify facilities by NAICS code (e.g., TRI), EPA linked each six-digit NAICS code to an appropriate point source category, as summarized in the “NAICS/Point Source Category Crosswalk” table (Table A-3 in Appendix A). This table was based on the SIC/Point

Source Category Crosswalk table (Table A-1 in Appendix A) and the NAICS/SIC Code Crosswalk that EPA developed for past comparisons.

There are some NAICS codes for which EPA has not established national ELGs. Table A-4 in Appendix A lists the NAICS codes for which facility discharge data are available in TRI, but for which EPA could not identify an applicable point source category. For a more detailed discussion, see Section 6 of the 2009 SLA Report (U.S. EPA, 2009).

3.1.3 Toxic Weighting Factors

As part of the Effluent Guidelines Program, EPA developed a wide variety of tools and methodologies to evaluate effluent discharges. EPA's Office of Water, Engineering and Analysis Division (EAD) maintains a Toxics Database compiled from over 100 references for more than 1,900 pollutants. The Toxics Database includes aquatic life and human health toxicity data, as well as physical and chemical property data. Each pollutant in this database is identified by a unique Chemical Abstract Service (CAS) number. EPA calculates TWFs from these data to account for differences in toxicity across pollutants and to provide the means to compare mass loadings of different pollutants. In its analyses, EPA multiplies a mass loading of a pollutant in pounds per year (lb/yr) by a pollutant-specific weighting factor to derive a "toxic-equivalent" loading (lb-equivalent/yr). Throughout this document, the toxic-equivalent is also referred to as TWPE. The Draft and Final TWF Development Documents discuss the use and development of TWFs in detail (U.S. EPA, 2005; U.S. EPA, 2006b).

EPA derives TWFs from chronic aquatic life criteria (or toxic effect levels) and human health criteria (or toxic effect levels) established for the consumption of fish. In the TWF method for assessing water-based effects, these aquatic life and human health toxicity levels are compared to a benchmark value that represents the toxicity level of a specified pollutant. EPA selected copper, a metal commonly detected and removed from industrial effluent, as the benchmark pollutant. The Final TWF Development Document contains details on how EPA developed its TWFs (U.S. EPA, 2006b). Table A-5 in Appendix A lists the TWFs for those chemicals in the *DMRLoads2009* and *TRIReleases2009* databases for which EPA has developed TWFs.

3.1.3.1 New Toxic Weighting Factors Developed During the 2011 Annual Reviews

During the 2011 Annual Reviews, EPA did not revise any TWFs or develop TWFs for any chemicals that had not previously had TWFs.

3.1.3.2 Calculation of TWPE

EPA weighted the annual pollutant discharges calculated from the *TRIReleases* (see Section 3.1.4) and *DMRLoads* (see Sections 3.1.5) databases using EAD's TWFs to calculate TWPE for each reported discharge. EPA summed the estimated TWPE discharged by each facility in a point source category to understand the potential hazard of the discharges from each category. The following subsections discuss the calculation of TWPE.

3.1.4 Data from TRI

TRI is the common name for Section 313 of the Emergency Planning and Community Right-to-Know Act. Each year, facilities that meet certain thresholds must report their releases and other waste management activities for listed toxic chemicals. Facilities must report the quantities of toxic chemicals recycled, collected, and combusted for energy recovery, treated for destruction, or disposed of. A separate report must be filed for each chemical that exceeds the reporting threshold. The TRI list of chemicals for reporting year 2009 includes more than 650 chemicals and chemical categories. For the 2011 toxicity rankings analysis, EPA used data for reporting year 2009, because they were the most recent available at the time the review began.

A facility must meet the following three criteria to be required to submit a TRI report for a given reporting year:

1. *NAICS Code Determination*. The primary NAICS code determines if TRI reporting is required. The primary NAICS code is associated with the facility's revenues, and may not relate to its pollutant discharges (73 FR 324666). Certain facilities in NAICS codes 11, 21, 22, 31 through 33, 42, 48 through 49, 51, 54, 56 and 81, and federal facilities are potentially subject to TRI reporting. EPA generally relies on facility claims regarding the NAICS code identification.

2. *Number of Employees*. Facilities must have 10 or more full-time employees or their equivalent. EPA defines a "full-time equivalent" as a person that works 2,000 hours in the reporting year (there are several exceptions and special circumstances that are well defined in the TRI reporting instructions).

3. *Activity Thresholds*. If the facility is in a covered NAICS code and has 10 or more full-time employee equivalents, it must conduct an activity threshold analysis for every chemical and chemical category on the current TRI list. The facility must determine whether it manufactures, processes, or otherwise uses each chemical at or above the appropriate activity threshold. Reporting thresholds are not based on the amount of release. All TRI thresholds are based on mass, not concentration. Different thresholds apply for persistent bioaccumulative toxic (PBT) chemicals than for non-PBT chemicals. Generally, non-PBT chemical threshold quantities are 25,000 pounds for manufacturing and processing activities and 10,000 pounds for other use activities. All thresholds are determined per chemical over the calendar year. For example, dioxin and dioxin-like compounds are considered PBT chemicals. The TRI reporting guidance requires any facility that manufactures, processes, or otherwise uses 0.1 grams of dioxin and dioxin-like compounds to report it to TRI (U.S. EPA, 2000).

In TRI, facilities report annual loads released to the environment of each toxic chemical or chemical category that meets reporting requirements. Facilities must report onsite releases or disposal to air, receiving streams, land, underground wells, and several other categories. They must also report the amount of toxic chemicals in wastes transferred to off-site locations, (e.g., POTWs, commercial waste disposal facilities).

For its toxicity rankings analysis, EPA focused on the amount of chemicals facilities reported either discharging directly to a receiving stream or transferring to a POTW. For facilities discharging directly to a stream, EPA took the annual loads directly from the reported TRI data for calendar year 2009. For facilities transferring to POTWs, EPA first adjusted the TRI pollutant loads reported to account for pollutant removal that occurs at the POTWs prior to discharge to the receiving stream. Table A-6 in Appendix A lists the POTW removals used for all TRI chemicals reported as transferred to POTWs.

Facilities reporting to TRI are not required to sample and analyze waste streams to determine the quantities of toxic chemicals released. They may estimate releases based on mass balance calculations, published emission factors, site-specific emission factors, or other approaches. Facilities are required to indicate, by a reporting code, the basis of their release estimate. TRI's reporting guidance is that, for most chemicals reasonably expected to be present but measured below the detection limit, facilities should use half the detection limit to estimate the mass released. However, for dioxins and dioxin-like compounds, non detects should be treated as zero.

TRI allows facilities to report releases as specific numbers or as ranges, if appropriate. Specific estimates are encouraged if data are available to ensure the accuracy; however, EPA allows facilities to report releases in the following ranges: 1 to 10 pounds, 11 to 499 pounds, and 500 to 999 pounds. For its toxicity rankings analyses, EPA used the midpoint of each reported range to represent a facility's releases, as applicable.

3.1.4.1 Utility of TRI Data

The data collected in TRI are particularly useful for ELG planning for the following reasons:

- TRI is national in scope, including data from all 50 states and U.S. territories/tribes;
- TRI includes releases to POTWs, not just direct discharges to surface water;
- TRI includes discharge data from manufacturing NAICS codes and some other industrial categories; and
- TRI includes releases of many toxic chemicals, not just those in facility discharge permits.

3.1.4.2 Limitations of TRI

For purposes of ELG planning, limitations of the data collected in TRI include the following:

- Small establishments (less than 10 employees) are not required to report, nor are facilities that do not meet the reporting thresholds. Thus, facilities reporting to TRI may be a subset of an industry.
- Release reports are, in part, based on estimates, not measurements, and, due to TRI guidance, may overstate releases, especially at facilities with large wastewater flows.

- Certain chemicals (polycyclic aromatic compounds (PACs), dioxin and dioxin-like compounds, metal compounds) are reported as a class, not as individual compounds. Because the individual compounds in most classes have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.

- Facilities are identified by NAICS code, not point source category. For some NAICS codes, it may be difficult or impossible to identify the point source category that is the source of the toxic wastewater releases.

Despite these limitations, EPA determined that the data summarized in *TRIReleases2009* were usable for the 2011 toxicity rankings analysis and prioritization of the toxic-weighted pollutant loadings discharged by industrial categories.

3.1.5 Data from PCS and ICIS-NPDES

EPA has used data reported to PCS as a part of its toxicity rankings analysis of existing effluent guidelines since the 2003 Annual Reviews (68 FRN 75515). Since 2002, EPA has been working to modernize PCS by creating a new data system called ICIS-NPDES. In 2006, some states began transitioning their DMR reporting from PCS to ICIS-NPDES. Currently 57 of the 71 states and territories/tribes have migrated to ICIS-NPDES. Therefore, for the 2011 Annual Reviews, EPA's view of nationwide discharges was split between two sets of data. EPA created the 2009 DMR Loadings Tool to combine the two systems (PCS and ICIS-NPDES) and generate industrial category rankings for all U.S. states and territories/tribes. EPA extracted the loads from the 2009 DMR Loadings Tool to create the *DMRLoads2009* database. Both PCS and ICIS-NPDES automate entering, updating, and retrieving NPDES data and track permit issuance, permit limits, monitoring data, and other data pertaining to facilities regulated by the NPDES program under the CWA.

More than 65,000 industrial facilities and wastewater treatment plants have permits for wastewater discharges to waters of the United States. To provide an initial framework for setting permitting priorities, EPA developed a major/minor classification system for industrial and municipal wastewater discharges. Major discharges usually have the capability to impact receiving waters if not controlled and, therefore, have received more regulatory attention than minor discharges. There are approximately 7,000 facilities (including sewerage systems) with major discharges and 15,000 facilities with minor discharges for which PCS and ICIS-NPDES have extensive records. Permitting authorities classify discharges as major based on an assessment of six characteristics (U.S. EPA, 2010):

1. Toxic pollutant potential;

2. Discharge flow: stream flow ratio;

3. Conventional pollutant loading;

4. Public health impact;

5. Water quality factors; and

6. Proximity to coastal waters.

Facilities with major discharges must report compliance with NPDES permit limits via monthly DMRs submitted to the permitting authority. The permitting authority enters the reported DMR data into PCS or ICIS-NPDES, including pollutant concentration and quantity values and identification of any types of permit violations.

Minor discharges may, or may not, adversely impact receiving water if not controlled. Facilities with minor discharges must report compliance with NPDES permit limits via monthly DMRs submitted to the permitting authority; however, EPA does not require the permitting authority to enter data in the PCS and ICIS-NPDES databases. For this reason, the PCS and ICIS-NPDES databases include data only for a limited set of minor discharges (i.e., if the state or other permitting authority chooses to include these data).

Parameters in PCS and ICIS-NPDES include water quality parameters (such as pH and temperature), specific chemicals, conventional parameters (such as biochemical oxygen demand (BOD_5) and total suspended solids (TSS)), and flow rates. Although other pollutants may be discharged, PCS and ICIS-NPDES contain data only for the parameters identified in the facility's NPDES permit. Facilities typically report monthly average pounds per day discharged, but also report daily maxima and average pollutant concentrations.

For the 2011 Annual Reviews, EPA used data for reporting year 2009, to correspond to the data obtained from TRI. For the 2011 Annual Reviews, EPA corrected certain aspects of the 2009 data (see Section 3.3). Using the DMR Loadings Tool, EPA calculated annual loads for the PCS and ICIS-NPDES data and then combined the calculated loads for each set of data. EPA extracted the results of the annual loads calculations in the *DMRLoads2009* database. Section 2 of the 2009 SLA Report provides details on the methodology and development of *DMRLoads2009* (U.S. EPA, 2009).

3.1.5.1 Utility of PSC and ICIS-NPDES

The data collected in the PCS and ICIS-NPDES data systems are particularly useful for the ELG planning process for the following reasons:

- PCS and ICIS-NPDES combined are national in scope, including data from all 50 states and 21 U.S. territories/tribes.
- Discharge reports included in PCS and ICIS-NPDES are based on effluent chemical analysis and metered flows.
- PCS and ICIS-NPDES include facilities in all SIC codes.
- PCS and ICIS-NPDES include data on conventional pollutants for most facilities and for the nutrients nitrogen and phosphorus for many facilities.

3.1.5.2 Limitations of PCS and ICIS-NPDES

Limitations of the data collected in the PCS and ICIS-NPDES data systems include the following:

- The data systems contain data only for pollutants a facility is required by permit to monitor; the facility is not required to monitor or report all pollutants actually discharged.

- The data systems include limited discharge monitoring data from minor dischargers.

- The data systems do not include data characterizing indirect discharges from industrial facilities to POTWs.

- Many of the pollutant parameters included in the data systems are reported as a group parameter and not as individual compounds (e.g., "Total Kjeldahl Nitrogen," "oil and grease"). Because the individual compounds in the group parameter may have widely varying toxic effects, the potential toxicity of chemical releases can be inaccurately estimated.

- In some cases, the data systems identify the type of wastewater (e.g., process wastewater, stormwater, noncontact cooling water) being discharged; however, most do not and, therefore, total flow rates reported to PCS and ICIS-NPDES may include stormwater and noncontact cooling water, as well as process wastewater.

- Pipe identification is not always clear. For some facilities, internal monitoring points are labeled as outfalls, and PCS and ICIS-NPDES may double-count a facility's discharge. In other cases, an outfall may be labeled as an internal monitoring point, and PCS and ICIS-NPDES may not account for all of a facility's discharge.

- Facilities are identified by SIC code, not point source category. For some SIC codes, it may be difficult or impossible to identify the point source category that is the source of the reported wastewater discharges[1].

- PCS and ICIS-NPDES were designed as a permit compliance tracking system and do not contain production information.

- PCS and ICIS-NPDES data may be entered into the data systems manually, which leads to data-entry errors.

- In PCS and ICIS-NPDES, data may be reported as an average quantity, maximum quantity, average concentration, maximum concentration, and/or minimum concentration. For many facilities and/or pollutants, average quantity values are not provided. In these cases, EPA is limited to estimating facility loads based on the maximum quantity. Section 3.2.3 of the 2009 SLA Report discusses the maximum quantity issue in detail (U.S. EPA, 2009).

- PCS and ICIS-NPDES data on conventional pollutants and the nutrients nitrogen and phosphorus are not used because of data quality concerns.

[1] ICIS-NPDES includes a data field for applicable ELGs; however, it is not required and typically not populated.

Despite these limitations, EPA determined that the data summarized in *DMRLoads2009* were usable for the toxicity rankings analyses and prioritizations of the toxic-weighted pollutant loadings discharged by industrial facilities. The combined PCS and ICIS-NPDES databases remain the only data source quantifying the pounds of regulated pollutants discharged directly to surface waters of the United States.

3.2 Methodology Correction Affecting Both Toxicity Rankings Analysis Databases

The 2009 SLA Report provides detailed information on the methodology EPA used to develop the toxicity rankings analysis databases (U.S. EPA, 2009). For the 2011 Annual Reviews, EPA did not make any methodological changes to the toxicity rankings analysis databases, *TRIReleases2009* and *DMRLoads2009*.

3.3 Corrections to the *DMRLoads2009* Database

EPA developed the *DMRLoads2009* database as part of the 2011 Annual Reviews using the methodology explained in the 2009 SLA Report (U.S. EPA, 2009) with the methodology updates described in Section 4.2.1 of the 2010 TSD (U.S. EPA, 2011).

During previous toxicity rankings analyses, EPA identified numerous facility-specific corrections for PCS and ICIS-NDPES data reported for calendar years 2000, 2002, 2004, and 2006 though 2008. Several of these corrections similarly apply to the 2009 DMR data. In addition, EPA reviewed the quality of the 2009 DMR data and facilities with discharges that have the greatest impact on total category loads and category rankings. Table B-2 in Appendix B of this report lists all corrections made to the 2009 DMR data in the DMR Loadings Tool.

3.3.1 DMRLoads2009: Categorization of Discharges

This subsection describes database corrections to facility categorization and pollutant discharges in *DMRLoads2009*. Section 4 of the 2009 SLA Report describes the SIC/Point Source Category Crosswalk development, which EPA uses to link between facility SIC codes and categories with existing ELGs (U.S. EPA, 2009). Because most point source categories are not defined by SIC code, the relationship between SIC code and point source category is not a one-to-one correlation. A single SIC code may include facilities in more than one point source category, and associating an SIC code with only one category may be an oversimplification. Also, many facilities have operations subject to more than one point source category. Further, facilities in some categories cannot be identified by SIC code (e.g., Centralized Waste Treatment facilities). Section 4 of the 2009 SLA Report describes the database changes, summarized below (U.S. EPA, 2009):

- *Facility-Level Point Source Category Assignment*. For some SIC codes that include facilities subject to guidelines from more than one point source category, EPA was able to assign each facility to the category that best applied to the majority of its discharges. EPA reviewed information available about each facility to determine which point source category applied to the facility's operations.

- *Pollutant-Level Point Source Category Assignment*. Many facilities have operations subject to more than one point source category. For most of these facilities, EPA cannot divide the pollutant discharges among the applicable point source categories. Two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category are listed below:

— Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF)/Pesticide Chemicals. EPA removed all pesticide discharges from the OCPSF Category and included them as discharges from the Pesticide Chemicals Category.

— Metal Products and Machinery (MP&M)/Metal Finishing. EPA used the methodologies described in Section 4 of the 2009 SLA Report (U.S. EPA, 2009) to apportion pollutant loads between the MP&M and Metal Finishing Categories.

3.3.2 DMRLoads2009: Internal Monitoring

This subsection describes database corrections to identify internal monitoring points in *DMRLoads2009*. As discussed in Sections 3.2.1.3 and 3.2.3.2 of the 2009 SLA Report (U.S. EPA, 2009), the 2009 DMR Loadings Tool calculated loads only for monitoring locations that are labeled as effluent. The effluent monitoring locations in the 2009 DMR Loadings Tool are:

- MLOC 1 – Effluent net discharge;
- MLOC 2 – Effluent gross discharge;
- MLOC A – After disinfection;
- MLOC B – Before disinfection; and
- MLOC SC – See comments.

As a result, the DMR Loadings Tool excludes discharges for internal monitoring locations such as intake water, influent to treatment, and intermediate points in the wastewater treatment system. However, during previous category reviews and detailed studies, EPA identified instances of double-counting that resulted from including certain internal monitoring points in the loads database. For example, a facility monitors for Pollutant A at the effluent from its wastewater treatment system (internal Outfall 101). Outfall 101 wastewater is later combined with other plant discharges at final Outfall 001 and is discharged to a receiving stream. The facility also monitors for Pollutant A at final Outfall 001. Both outfalls are effluent monitoring points identified as MLOC 1 or MLOC 2; however, Outfall 101 is upstream of the final outfall. Calculating loads for Pollutant A at both the internal and final outfalls double-counting Pollutant A discharges. EPA identified instances where pollutant discharges are reported for multiple monitoring locations along the same discharge line and eliminated the discharges for the upstream monitoring locations. EPA made these corrections to the 2009 data in the DMR Loadings Tool. A complete list of these corrections made in the DMR Loadings Tool can be found in Table B-2 of Appendix B of this report.

3.3.3 DMRLoads2009: Intermittent Discharges

This section describes database corrections made for intermittent discharges in *DMRLoads2009*. As described in Sections 3.2.1.3 and 3.2.3.2 of the 2009 SLA Report (U.S. EPA, 2009), the DMR Loadings Tool assumes that all discharges in PCS and ICIS-NPDES are continuous (24 hours per day for all days in the monitoring period). During previous annual reviews, EPA identified facility discharges that are intermittent and therefore are overestimated by the DMR Loadings Tool. EPA calculated annual loads for these discharges based on information obtained from the facility on the frequency and duration of wastewater discharges. EPA made these corrections in the 2009 data in the DMR Loadings Tool.

3.3.4 DMRLoads2009: Excluded Pollutant Parameters

This section describes database corrections made to exclude selected water quality parameters and flow from the annual load calculation in 2009 DMR Loadings Tool. As described in Sections 3.2.1.3 and 3.2.3.2 of the 2009 SLA Report (U.S. EPA, 2009), facilities report pollutant mass quantities, pollutant concentrations, and wastewater flow rates to PCS and ICIS-NPDES using a variety of units. EPA's PCS CNVRT program and the ICIS-NPDES Convert Module convert the discharges into standard units of kilograms per day (kg/day) for mass quantities, milligrams per liter (mg/L) for concentrations, and millions of gallons per day (MGD) for flow rates. However, some parameters are reported in units that cannot be converted into kg/day or mg/L (e.g., temperature, pH, fecal coliform, whole effluent toxicity). EPA excluded these parameters from the toxicity rankings analysis. Table B-3 of Appendix B lists the excluded parameters.

3.3.5 DMRLoads2009: Pollutant Corrections

This section describes database changes made to discharges of specific pollutants reported to the DMR for EPA's 2011 toxicity rankings analysis in the 2009 DMR Loadings Tool.

During the reasonableness checks of the PCS CNVRT output, EPA identified unusually high mercury concentrations reported to PCS by facilities located in Ohio in the PCS CNVRT output. These facilities reported mercury discharges using PRAM 50092 (Mercury Total Low Level). The PRAM 50092 concentrations in the 2004 CNVRT output ranged from 0.2 to 673 mg/L and from 2 pg/L to 4.1 mg/L in the 2009 CNVRT output. EPA contacted the Ohio Environmental Protection Agency (Ohio EPA) to determine the correct reporting units for PRAM 50092 (Stuhlfauth, 2007). An Ohio EPA representative explained that Ohio EPA started requiring low level mercury analyses in 2002. At that time, some facilities had limits in micrograms per liter (µg/L). Currently, all of the limits are in nanograms per liter (ng/L).

As a result of this contact, EPA concluded that the units for the PRAM 50092 concentrations for the 2004 PCS data should be ng/L, not mg/L. Based on the 2009 distribution of Ohio mercury concentrations, EPA concluded that the error for the 2004 data persisted in 2009. Therefore, EPA corrected the concentrations by dividing all concentrations for PRAM 50092 reported by facilities in Ohio in the DMR Pollutant Loadings Tool by one million.

3.3.6 DMRLoads2009: Data Quality Review

EPA evaluated the quality of the PCS and ICIS-NPDES DMR data for use in *DMRLoads2009* as part of the 2011 toxicity rankings analysis. This evaluation considered data completeness, accuracy, reasonableness, and comparability. The *Quality Assurance Project Plan for the 2009 Annual Screening-Level Analysis of TRI and PCS Industrial Category Discharge Data* describe the quality objectives in more detail (ERG, 2009). EPA conducted quality reviews for three stages of the development of *DMRLoads2009*: 1) PCS CNVRT and ICIS-NPDES

Convert Module outputs; 2) the 2009 DMR Loadings Tool output; and 3) *DMRLoads2009* results. The following discussion provides an overview of the quality review steps for each stage:

- **PCS CNVRT and ICIS-NPDES Convert Module outputs**. EPA conducted an initial quality review of the extracted PCS CNVRT and ICIS-NPDES DMR data to evaluate its completeness, reasonableness, and comparability. For completeness, EPA compared the number of major facilities and the universe of SIC codes in the 2009 DMR data to the DMR data in 2008.

  EPA reviewed the DMR data for reasonableness to identify any data quality issues, such as misreported units that the PCS CNVRT and ICIS-NPDES Convert Module did not correct. EPA identified several wastewater flows that exceeded the reasonable range. EPA reviewed these flows and developed the flow correction function for the PCS CNVRT and ICIS-NPDES Convert Module (described in Section 3.2.3 of the 2009 SLA Report (U.S. EPA, 2009)). This function is designed to identify data entry errors for flows greater than 1,000 MGD. The PCS CNVRT and ICIS-NPDES Convert Module corrects all flows exceeding 5,000 MGD and applies more conservative criteria to correct flows from 1,000 to 5,000 MGD. The PCS CNVRT and ICIS-NPDES Convert Module made the following corrections to the PCS and ICIS-NPDES wastewater flows:

  — 2,230 corrections based on month-to-month variations;
  — 1,281 corrections based on comparing flows to design flows; and
  — 1,186 corrections based on assuming that flows exceeding 5,000 MGD are reported in units of GPD.

- **Load Calculator routines.** EPA's quality review for the Load Calculator routines included accuracy checks for database queries on the 2009 data in the DMR Loadings Tool. EPA reviewed the programming code used to develop each query to verify the logic and verified that the number of records in the output table equaled the number of records in intermediate queries to ensure that no data were missing and that there were no duplicate data. In addition, EPA performed hand calculations to verify the accuracy of the Load Calculator module outputs during reviews of facility discharges for *DMRLoads2009* results.

- **DMRLoads2009 results.** EPA's quality review of the *DMRLoads2009* results included the following:

  — *Completeness checks*. EPA compared counts of dischargers in *DMRLoads2009* to *DMRLoads2008* to confirm the completeness of the database. There were 2,036 major discharging facilities that reported a load to *DMRLoads2008* and 1,944 major discharging facilities that reported a load to *DMRLoads2009*. There were 14,888 minor discharging facilities that reported a load to *DMRLoads2008* and 15,565 minor discharging facilities that reported a load to *DMRLoads2009*.

  — *Accuracy of facility discharges*. EPA reviewed the accuracy of facilities' discharges that had the greatest impact on total category loads and category rankings to identify possible calculation errors. EPA reviewed monitoring period data in PCS and ICIS-NPDES, measurement data available on EPA's Envirofacts web page, and information from each facility's NPDES permit and permit fact sheet. In some cases, EPA contacted facilities to verify the measurements in their DMR. Section 3.3.7 describes EPA's review of facility discharges in more detail.

— *Accuracy of category discharges*. EPA reviewed the accuracy of category discharges by verifying that pollutant discharges in PCS and ICIS-NPDES were assigned to the appropriate point source category. EPA used engineering judgment to determine if the pollutant discharge was reasonably associated with the point source category. Section 3.3.1 discusses facility-level and pollutant-level category assignments.

— *Accuracy of database queries*. EPA's quality review for the development of *DMRLoads2009* included accuracy checks for database queries in *DMRLoadsAnalysis2009*[2] and *DMRLoads2009*. Documentation of accuracy checks is provided in a QC table in each Microsoft Access™ database.

— *Reasonableness of pollutant loads*. EPA reviewed the DMR Loadings Tool's 2009 output (i.e., the calculated kg/year for each pollutant at each discharge pipe and monitoring location) for those pollutant discharges with the highest toxic-weighted loads (e.g., dioxins, polychlorinated biphenyls (PCBs), and mercury). To identify possible errors in recording units of measure, EPA identified calculated discharges that were orders of magnitude higher than previous years' discharges or discharges from other facilities within the same category. EPA reviewed quantities or concentrations and flows that the DMR Loadings Tool database used to calculate the annual discharge. EPA compared these measurements with measurements available on EPA's Envirofacts web page. If the measurements were similar, then EPA concluded that the output was acceptable. If the data did not match between the databases and Envirofacts, EPA corrected the data to match Envirofacts. When EPA was unsure what the correct data were, EPA contacted the facility or permitting authority for more information (see Section 3.3.7).

— *Reasonableness of facility loads*. EPA identified facility discharges with the highest TWPE. EPA identified facilities for review whose pollutant discharges accounted for more than 95 percent of the TWPE for their point source category. EPA compared 2009 DMR data to other available information, such as information from EPA's Envirofacts web page, and the facility's NPDES permit and permit fact sheet. If the data did not match between the database and Envirofacts, EPA corrected the data to match Envirofacts. When EPA was unsure what the correct data were,

[2] *DMRLoadsAnaysis2009* is a database used to evaluate the impacts of calculation assumptions and corrects SIC Code classifications for certain facilities and certain discharges (i.e., OCSPF and Pesticide discharges). See Section 3.2 of the 2009 SLA Report for further information (U.S. EPA, 2009).

EPA contacted the facility or permitting authority for more information (see Section 3.3.7).

— *Comparability*. EPA compared *DMRLoads2009* to *DMRLoads2008* to identify pollutant discharges or wastewater flows that differed more than the year-to-year variation of other chemicals and facilities. EPA used this comparison to determine if quantity, concentration, or flow corrections were needed for facility discharges with the highest TWPE. If the comparison was unavailable (e.g., the pollutant was not previously reported) EPA contacted the facility or permitting authority (see Section 3.3.7).

3.3.7 DMRLoads2009: Facility Reviews

EPA reviewed the accuracy of facility discharges that had the greatest impact on total category loads and category rankings in *DMRLoads2009*. EPA reviewed facilities with the highest toxic-weighted discharges of individual pollutant parameters. For the identified facilities, EPA used the following steps to review the accuracy of the loads calculated from PCS and ICIS-NPDES data:

1. Reviewed database corrections for *DMRLoads2008, DMRLoads2007*, *PCSLoads2004*, *PCSLoads2002*, and *PCSLoads2000* to determine whether corrections made during previous reviews should apply to the 2009 DMR discharges.

2. Reviewed 2009 DMR data, hand-calculated annual pollutant loads, and compared the results to loads calculated by the DMR Loading Tool and stored in *DMRLoads2009*.

3. Reviewed PCS and ICIS-NPDES pipe description information available in PCS, EPA's on-line Envirofacts data system, ICIS-NPDES supporting tables, or from the facility's NPDES permit and permit fact sheet to identify monitored pollutant discharges that are:

   — Intermittent (e.g., tidal, seasonal, or occur after a storm event);

   — Internal monitoring locations from which wastewater is combined with other waste streams and monitored again, resulting in double-counting loads; and

   — Not representative of category discharges (e.g., stormwater runoff from nonprocess areas, noncontact cooling water, or wastewater related to operations in another point source category).

Table 3-2 presents EPA's facility review and corrections made to the *DMRLoads2009* database.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
Ahlstrom Cogeneration Facility	Windsor Locks, CT	Pulp & Paper	Chlorine	Outfall 006 2009 Oct and Nov, and outfall 008 2009 Jan through Sept chlorine concentrations are 1,000 times higher than other monthly concentrations. Outfall 006 and 008 specified chlorine concentrations were in mg/L in the DMR Loadings Tool, while Envirofacts concentrations are in ug/L.	Revise specified 2009 chlorine concentrations for outfalls 006 and 008 by dividing by 1,000.
Angola Wire Products Inc.	Angola, IN	Metal Finishing	Copper	Outfall 001 2009 flows are greater than 2,000 MGD; however, the facility is a minor discharger.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.
Anniston Army Depot	Anniston, AL	Metal Finishing	Copper	Outfall 020 Dec 2009 iron, copper, and TSS concentrations are 100 times higher than other monthly concentrations.	Revise Dec 2009 iron, copper, and TSS concentrations for outfall 020 by dividing by 100.
Barton Lexa Water Association	Poplar Grove, AR	Drinking Water	Chlorine	Facility contact identified that the 2009 flow values for outfall 101 should be reported in GPD, not MGD (Carruth, 2011).	Revise 2009 flow values for outfall 101 by dividing by 1,000,000.
BASF-Wyandotte	Wyandotte, MI	OCPSF	Mercury	Outfall 001 2009 Jan, Mar, Jun, Jul, and Aug 2009 mercury concentrations are in the DMR Loadings Tool as mg/L, while the concentrations in Envirofacts are in ng/L.	Revise Jan, Mar, Jun, Jul, and Aug 2009 mercury concentrations for outfall 001 by dividing by 1,000,000.
Bass Point Resort Condos	Morgan County, MO	Amusement & Recreation Services	Chlorine	Outfall 001 2009 flows are greater than 2,000 MGD; however, the facility is a minor discharger.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
Bayer CropSciences Institute	Institute, WV	Pesticide Chemicals	Carbaryl	Outfall 005 Sept 2009 carbaryl quantity is 1,000 times higher than all other quantities. In 2010, facility contact identified that the 2008 carbaryl concentrations and quantities were below the detection limit at 0.003 mg/L and 2 lbs/day. 2009 concentrations and quantities are below the BDL values indicated by the facility contact (Smith, 2010).	Revise Sept 2009 quantity by dividing by 1,000. Add BDL indicators to all 2009 carbaryl concentrations and quantities for outfall 005.
Berwin Business Center	Festus, MO	Real Estate	Chlorine	Outfall 001 Oct, Nov, and Dec 2009 flows are 1,000,000 times higher than other monthly flows.	Revised Oct, Nov, and Dec 2009 for outfall 001 flow by dividing by 1,000,000.
Bridal Cave Devlpmnt WWTF	Camdenton, MO	Miscellaneous Retail	Chlorine	Outfall 001 2009 flows are 1,000,000 times higher than flows reported in 2008.	Revise 2009 flow for outfall 001 by dividing by 1,000,000.
Brunswick Cellulose, Inc.	Brunswick, GA	Pulp & Paper	2,3,7,8-TCDD	Facility contact confirmed that the 2009 TCDD concentration for outfall 001was below the detection limit. (Schwartz, 2011a).	Revise Jun 2009 TCDD concentration for outfall 001 by adding a BDL indicator.
Bulk Plant Inc Flemingsbrg #39	Fleming County, KY	Petroleum Refining	Benzene	Facility contact identified 2009 flow as GPD, not MGD, for Outfall 001. Facility contact verified maximum flow values and indicated that the average flow values should be the same as the maximum (Becker, 2011).	Revise 2009 flow for outfall 001 by dividing the maximum flows by 1,000,000 and making the average and maximum flow values the same.
Bulk Plant Inc Grayson #266	Carter County, KY	Petroleum Refining	Benzene	Facility contact identified 2009 flow as GPD, not MGD, for Outfall 001. Facility contact verified maximum flow values and indicated that the average flow values should be the same as the maximum (Becker, 2011).	Revise 2009 flow for outfall 001 by dividing the maximum flows by 1,000,000 and making the average and maximum flow values the same.
Butler County Landfill	Poplar Bluff, MO	Landfills	Lead	Facility contact identified that the 2009 lead concentrations for Outfall 001 and 002 should be reported as ug/L, not mg/L (Cozad, 2011).	Revise 2009 lead concentrations for outfalls 001 and 002 by dividing by 1,000.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
C&H Sugar	Crockett, CA	Sugar Processing	Methylmercury	Outfall 001 and 002 Oct 2009 methylmercury concentrations are 100,000 time higher than other monthly concentrations.	Revise Oct 2009 methylmercury concentrations for outfall 001 by dividing by 100,000.
Cascade Pacific Pulp	Halsey, OR	Pulp & Paper	2,3,7,8-TCDD	Facility contact identified that all 2009 TCDD quantities for outfall 001are below the detection limit (Schwartz, 2011a).	Revise 2009 TCDD quantities for outfall 001 by adding BDL indicators.
Charlotte Walters	Sweetwater, AL	Automotive Dealers & Service Stations	Lead	Outfall 001 2009 flows are greater than 2,000 MGD; however, the facility is a minor discharger. Flows are 1,000,000 times higher than expected from a minor discharger.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.
Citizens Gas & Coke Utility	Indianapolis, IN	Oil & Gas	Benzo(a)pyrene	Dec 2009 benzo(a)pyrene concentrations for outfalls 009, 013, 014, 017, and 019 are 1,000 times higher than all other concentrations. Remaining 2009 concentrations of the correct magnitude also are reported below the detection limit.	Revise Dec 2009 benzo(a)pyrene concentrations for the specified outfalls by dividing by 1,000 and adding a BDL indicators.
Claiborne Mill	Claiborne, AL	Pulp & Paper	2,3,7,8-TCDD	Outfall 001 Jun 2009 TCDD concentration reported in Envirofacts is the same value as the Dec 2009 concentration; however, it is missing the BDL indicator.	Revise June 2009 TCDD concentration for outfall 001 by adding a BDL indicator.
Clean Harbors Baton Rouge, LLC	Baton Rouge, LA	CWT	Benzidine	Facility contact identified that the Dec 2009 benzidine concentration for outfall 001 is below the dectection limit (Clark, 2011).	Revise Dec 2009 benzidine concentration for outfall 001 by adding a BDL indicator.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
Crossett Harbor Port	Crossett, AR	Hotels & Other Lodging	Mercury	Outfall 001 Sept 2009 mercury quantity is 1,000,000 times higher than other monthly quantities and Dec 2009 mercury quantity is 1,000 times higher than all other monthly quantities.	Revise Sept 2009 mercury quantity by dividing by 1,000,000 and Dec 2009 mercury quantity by dividing by 1,000.
Dana Transport Inc.	Nitro, WV	Trucking & Warehousing	Mercury	Outfall 001 2009 mercury quantities in the DMR Loadings Tool do not match the quantity calculated using the concentration and flow data in Envirofacts. EPA used the concentration and flow to calculate the correct quantity.	Revise 2009 mercury quantities for outfall 001.
Doe Run, Fletcher Mine/MI	Viburnum, MO	Ore Mining	Lead	Outfall 001 Nov and Dec 2009 lead concentrations are 1,000 times higher than other monthly concentrations.	Revise Nov and Dec 2009 lead concentrations for outfall 001 by dividing by 1,000.
Expo Water Park, Inc.	Tulsa, OK	Amusement & Recreation Services	Chlorine	Outfall 001 2009 flows are greater than 2,000 MGD; however, the facility is a minor discharger.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.
Fisheries Development Corporation	Hagerman, ID	CAAP	Copper	Facility contact identified that copper concentrations should be zero for 2009 (Bogaard, 2011).	Revise 2009 copper concentrations.
Freeman United Coal-Industry	Industry, IL	Coal Mining	Manganese	Outfall 019 2009 flows are 1,000 times higher than flow data in previous years.	Revise 2009 flow for outfall 019 by dividing by 1,000.
Holiday Motel WWTF	Cleveland, TX	Hotels & Other Lodging	Chlorine	Outfall 001 Feb 2009 flow is 1,000,000 times higher than other months of data.	Revise Feb 2009 flow for outfall 001 by dividing by 1,000,000.
Insulfoam	Mead, NE	Plastics Molding And Forming	Chlorine	Outfall 001 2009 flows are 1,000,000 times higher than previous years of data.	Revise all 2009 flow values for outfall 001 by dividing by 1,000,000.
Lost Canyon Lakes	Steedman, MO	Hotels & Other Lodging	Chlorine	Outfall 002 Jun 2009 flow is 100 times higher than other months of data and Aug and Nov 2009 flows are 1,000,000 times higher than other months of data.	Revise Jun 2009 flow by dividing by 100 and revise Aug and Nov 2009 flow by dividing by 1,000,000.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
Maplesville Lumber Mill	Maplesville, AL	Timber Products Processing	Iron	Outfall 008 Dec 2009 flow is 1,000 times higher than other months of data.	Revise Dec 2009 flow for outfall 008 by dividing by 1,000.
Marion Co Sanitary Landfill	Marion County, KY	Landfills	Iron	Outfall 001 and 002 2009 flows are 5,500 to 16,500 MGD; however, facility is a minor discharger.	Revise 2009 flows for outfalls 001 and 002 by dividing by 1,000,000.
Matthews High School	OH	Educational Services	Ammonia as N	Outfall 001 Feb, Mar, and Apr 2009 ammonia quantities and flows are 1,000,000 times higher than other months of data.	Revise Feb, Mar, and Apr 2009 ammonia quantities and flows for outfall 001 by dividing by 1,000,000.
Monterey Coal Company-Mine 2	Albers, IL	Coal Mining	Manganese	Outfall 001 2009 flows are in Envirofacts as MGD. The 2010 flows in Envirofacts are the same order magnitude but in GPM.	Revise 2009 flows for outfall 001.
Mountain State Carbon, LLC	Follansbee, WV	Iron and Steel Manufacturing	Aluminum	Outfall 005 2009 aluminum concentrations, Jan through Jun, are 1,000 times higher than the remaining 2009 concentrations and more recent (2010 data).	Revise Jan to Jun 2009 aluminum concentrations for outfall 005 by dividing by 1,000.
Mueller Company	Albertville, AL	Metal Molding and Casting	Chlorine	Facility contact identified that the June 2009 chlorine concentration for outfall 015 should be 1.35 mg/L, not 135 mg/L (Warren, 2011a).	Revise Jun 2009 chlorine concentration.
Palm Coast WTP #3 - Membrane C	FL	Drinking Water	Hydrogen sulfide	Florida DEP verified the concentrations and units (LB/1000 GA) for 2009 hydrogen sulfide data for outfall 001. Facility contact also provided the conversion calculation between mg/L and LB/1000 GA (Sedano, 2011).	Revise 2009 hydrogen sulfide concentrations for outfall 001.
Rayonier Performance Fibers	Jesup, GA	Pulp & Paper	2,3,7,8-TCDD	Facility contact identified that the Mar 2009 TCDD concentration for outfall 0A0 is below the detection limit (Schwartz, 2011a).	Revise Mar 2009 TCDD concentration for outfall 0A0 by adding BDL indicator.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
SC Dept Corr/Wateree River	Sumter, SC	Justice, Public Order, & Safety	Mercury	Facility contact identified that the 2009 mercury concentration units for outfall 001 should be ng/L not mg/L (Stoudemire, 2011).	Revise 2009 mercury concentrations for outfall 001 by dividing by 1,000,000.
Seapac of Idaho Inc	Hagerman, ID	CAAP	Copper	Facility contact identified that the copper concentrations are ug/L not mg/L for outfall 001 (VanTassel, 2011).	Revise 2009 copper concentrations by dividing by 1,000.
Smurfit-Stone Container	Florence, SC	Pulp & Paper	Sulfur	Facility contact verified the 2009 sulfide concentrations and flows for outfall 001. The sulfide discharges are due to the kraft pulping process (O'Shaughnessy, 2011).	No action.
Solutia Inc	Anniston, AL	OCPSF	PCB-1242	Facility contact verified the 2009 PCB concentrations and flows for outfall 012 (Warren, 2011b).	No action.
Special Metals Corp	New Hartford, NY	Nonferrous Metals Manufacturing	PCB-1254, PCB-1248, PCB-1241	Outfall 001 2009 PCB concentrations are below the detection limit, but quantities do not have BDL indicator. Jan to Jun 2009 PCB quantities are also 1,000 times higher than others.	Revise 2009 PCB quantities for outfall 001 by adding BDL indicators where concentrations are reported below the detection limit and dividing Jan to June 2009 PCB quantities by 1,000.
Sunny Acres II LLC	High Ridge, MO	Real Estate	Chlorine	Outfall 001 2009 flows are 1,000,000 times higher than previous years of data.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.
The Horny Toad	Lake Ozark, MO	Food Services	Chlorine	Outfall 001 2009 flows are 1,000,000 times higher than previous years of data.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.
Tiger Sunbelt Industries	Atmore, AL	Inorganic Chemicals	Sulfur	Outfall 001 Dec 2009 average sulfur concentration does not have a BDL indicator, but is the same value as the maximum concentration that has a BDL indicator.	Revise Dec 2009 average sulfur concentration for outfall 001 by adding a BDL indicator.

Table 3-2. Summary of DMRLoads2009 Facility Review

Facility	Location	Point Source Category	Pollutant(s) in Question	Review Findings	Action Taken/Database Correction
White mountain Apache Tribe	Greer, AZ	Hotels & Other Lodging	Chlorine	Outfall 001 flows are greater than 350 MGD; however, facility is a minor discharger.	Revise June 2009 flow by dividing by 100,000, Oct 2009 flow by dividing by 100, Dec 2009 flow by dividing by 1,000.
Windsong MHP WWTF	Gravois Mills, MO	Real Estate	Chlorine	Outfall 001 2009 flows are 1,000,000 times higher than previous years of data.	Revise 2009 flows for outfall 001 by dividing by 1,000,000.

3.4 Corrections to the *TRIReleases2009* Database

EPA developed the *TRIReleases2009* database as part of the 2011 Annual Reviews using the methodology explained in the 2009 SLA Report (U.S. EPA, 2009) with the methodology updates described in Section 4.2.2 in the 2010 TSD (U.S. EPA, 2011).

During previous toxicity rankings analyses, EPA identified numerous facility-specific corrections for TRI data reported for calendar years 2002 through 2008. Several of these corrections similarly apply to the 2009 TRI data. In addition, EPA reviewed the quality of the 2009 TRI data for facilities with discharges that have the greatest impact on total category loads and category rankings. Table B-1 in Appendix B of this report lists all corrections made to the 2009 TRI data.

3.4.1 TRIReleases2009: Categorization of Discharges

This section describes database corrections to categorization of facilities and pollutant discharges in *TRIReleases2009*. Section 4 of the 2009 SLA Report describes the development of the NAICS/Point Source Category Crosswalk, which EPA uses to link between facility NAICS codes and categories with existing ELGs (U.S. EPA, 2009). Because most point source categories are not defined by NAICS code, the relationship between NAICS code and point source category is not a one-to-one correlation. A single NAICS code may include facilities in more than one point source category, and associating an NAICS code with only one category may be an oversimplification. Also, many facilities have operations subject to more than one point source category. Further, facilities in some categories report a variety of NAICS codes that do not correlate directly to a point source category, precluding identification by NAICS code (e.g., Centralized Waste Treatment facilities). Section 5 of the 2009 SLA Report describes the database changes, summarized below (U.S. EPA, 2009):

- *Facility-Level Point Source Category Assignment.* For some NAICS codes that include facilities subject to guidelines from more than one point source category, EPA was able to assign each facility to the category that best applied to the majority of its discharges. EPA reviewed information available about each facility to determine which point source category applied to the facility's operations.

- *Pollutant-Level Point Source Category Assignment.* Many facilities have operations subject to more than one point source category. For most of these facilities, EPA cannot divide the pollutant discharges among the applicable point source categories. Below are two exceptions where EPA was able to assign wastewater discharges of certain chemicals to the appropriate point source category:

  — OCPSF/Pesticide Chemicals. EPA removed all pesticide discharges from the OCPSF Category and included them as discharges from the Pesticide Chemicals Category.

  — MP&M/Metal Finishing. EPA used the methodologies described in Section 4 of the 2009 SLA Report to apportion pollutant loads between the MP&M and Metal Finishing Categories.

- *Categories Not Identified by NAICS Code (e.g., Centralized Waste Treatment, Waste Combustor, and Landfills).* The NAICS/Point Source Category Crosswalk does not assign any NAICS codes to the Centralized Waste Treatment (CWT) Point Source Category (40 CFR Part 437), Waste Combustor Point Source Category (30 CFR Part 444), or Landfills Category (40 CFR Part 445). Furthermore, the applicability of these three regulations is not defined by NAICS codes and no NAICS code properly describes the CWT, waste combustor, or landfill services. Currently, EPA assigns all facilities reporting NAICS code 562213 (Solid Waste Combustors and Incinerators) as part of the Waste Combustor Category. The remaining facilities, with NAICS codes 562211 (Hazardous Waste Treatment and Disposal) and 562219 (Other Nonhazardous Waste Treatment and Disposal), are included in all three categories, which over estimates the category loads. During previous annual reviews, EPA has identified certain facilities that should be categorized as a CWT, waste combustor, or landfill. EPA assigned these facilities to the correct industrial category. As facilities continue to be reviewed due to high TWPE, EPA classifies them into the correct industrial category based on facility operations.

3.4.2 *TRIReleases2009*: Pollutant Corrections

This section describes database corrections made to discharges of specific pollutants reported to the TRI for EPA's 2011 toxicity rankings analysis in the *TRIReleases2009* database.

- *Metal Compounds.* For TRI reporting, facilities may be required to report discharges of a metal (e.g., zinc) and its compounds (e.g., zinc compounds) on a single reporting form. Because the release quantity for the metal compound reporting is based on the mass of the parent metal, EPA uses the parent metal TWF to calculate TWPE for the metal and metal compound discharges. For ranking purposes, EPA combined the TWPEs for the metal and metal compounds (i.e., TWPE reported for "zinc and zinc compounds"). For more details on this correction, see Section 3.4.4 of the 2009 SLA Report (U.S. EPA, 2009).

- *Sodium Nitrite.* For TRI reporting, sodium nitrite release quantities are reported as the mass of the sodium nitrite. Sodium nitrite is an ionic salt that will fully dissociate into nitrite and sodium ions in aqueous solutions. In addition, the nitrite ions are unstable in water and will oxidize to nitrate. Therefore, EPA converted the pounds of TRI-reported sodium nitrite discharges to pounds of nitrogen in the discharge and used the TWF for "nitrate as N" (0.0032) to calculate TWPE for sodium nitrite. In addition, EPA also used the POTW removal for nitrate to account for the removal of sodium nitrite in POTWs.

- *Phosphorus (Yellow or White).* Yellow and white phosphorus, both allotropes of elemental phosphorus, are hazardous chemicals that spontaneously ignite in air. During the 2006 toxicity rankings analysis, EPA determined that facilities were incorrectly reporting discharges of total phosphorus (i.e., the phosphorus portion of phosphorus-containing compounds) as phosphorus (yellow or white) (U.S. EPA, 2006a). Therefore, EPA deleted all phosphorus (yellow or white) discharges reported to TRI for the 2011 toxicity rankings analysis.

3.4.3 TRIReleases2009: Data Quality Review

EPA evaluated the quality of TRI data for use in the 2011 toxicity rankings analysis and prioritization of loadings of toxic and nonconventional pollutants discharged by industrial categories based on completeness, accuracy, reasonableness, and comparability. The *Quality Assurance Project Plan for the 2009 Annual Screening-Level Analysis of TRI, ICIS-NPDES, and PCS Industrial Category Discharge Data* describes the quality objectives in more detail (ERG, 2009). The following discussion provides an overview of the quality review steps:

- *Completeness Checks.* EPA compared counts of facilities in TRIReleases2009 to TRIReleases2008, TRIReleases2007, TRIReleases2005, TRIReleases2004, TRIReleases2003, TRIReleases2020, and TRIReleases2000 to describe the completeness of the database. The comparison showed that for 86 percent of the NAICS code groupings, the number of facilities reporting wastewater discharges changed by less than 25 percent from 2008 to 2009. EPA also determined that most NAICS codes exhibiting a large percentage change did so because only a few facilities in these NAIC codes reported discharges (e.g., a change from one facility to three facilities is equivalent to a 200 percent increase).

- *Accuracy of Facility Discharges.* EPA reviewed the accuracy of facilities' discharges that had the greatest impact on total category loads and category rankings. EPA identified facilities for review whose pollutant discharges accounted for more than 95 percent of the TWPE for their point source category. EPA compared 2009 TRI data to other available information, such as PCS and ICIS-NPDES, information from EPA's Envirofacts web page, the facilities' NPDES permits and permit fact sheets, and discussion with facility contacts.

- *Accuracy of Category Discharges.* EPA reviewed the accuracy of category discharges by verifying that pollutant discharges in TRI were assigned to the appropriate point source category. EPA used engineering judgment to determine if pollutant discharges were reasonably associated with the point source category.

- *Accuracy of Database Queries.* EPA's quality review for the development of *TRIReleases2009* included accuracy checks for database queries in *TRICalculations2009*[3] and *TRIReleases2009*. Documentation of accuracy checks is provided in a QC table in each Microsoft Access™ database.

- *Comparability.* EPA compared TRIReleases2009 to TRIReleases2008, TRIReleases2007, TRIReleases2005, TRIReleases2004, TRIReleases2003, TRIReleases2020, and TRIReleases2000 to identify pollutant discharges that differ more than the year-to-year variation of other chemicals and facilities. From the comparison, EPA determined that 63 percent of the pollutants discharged in both 2009 and 2008 had a change of less than 50 percent in the quantity discharged. EPA also determined that most of the pollutants with a large

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[3] *TRICalculations2009* is a database EPA created to analyze raw TRI data. See Section 2.4 of the 2009 SLA Report for more detailed information (U.S. EPA, 2009).

percentage change reflected initial discharges of small quantities. In addition, most of these pollutant discharges resulted in small TWPEs.

3.4.4 TRIReleases2009: Facility Reviews

Table 3-3 presents EPA's TRI facility review and corrections made to the *TRIReleases2009* database. EPA reviewed the accuracy of calculated discharges from facilities with discharges that have the greatest impact on total category loads and category rankings. EPA used the following criteria to select facilities for review:

- Facilities with the highest toxic-weighted discharges of all facilities reporting to TRI for reporting year 2009;
- Facilities with the highest toxic-weighted discharges of individual chemicals that contribute the majority of the toxic-weighted discharges for all categories; and
- Facilities with the highest toxic-weighted discharges from categories that contribute the majority of the toxic-weighted discharges for all categories.

For the identified facilities, EPA used the following steps to review the accuracy of the loads calculated from TRI data.

1. Review database corrections for *TRIReleases2008, TRIReleases2007, TRIReleases2005*, *TRIReleases2004*, *TRIReleases2003*, *TRIReleases2002*, and *TRIReleases2000* to determine whether corrections were made during previous reviews and evaluate whether these corrections should be applied to *TRIReleases2009*.
2. Review discharges reported to TRI for other reporting years (i.e., 2000, 2002, 2003, 2004, 2005, 2007 and 2008) and compare to discharges reported to TRI for reporting year 2009.
3. Review 2009 DMR data in PCS and ICIS-NPDES, if available, to hand-calculate annual pollutant loads and compare to discharges reported to TRI for reporting year 2009.
4. Contact the facility to verify whether the pollutant discharges are reported correctly.

Table 3-3. Summary of *TRIReleases2009* Facility Review

Facility Name	Facility Location	Point Source Category	Pollutant(s) in Question	Review Findings	Actions Taken/Database Correction
Cahaba Pressure Treated Forest Products Inc	Brierfield, AL	Timber Products Processing	Dioxin Compounds	Facility did not provide a water congener distribution in 2009.	Revise dioxin distribution based on the reported water discharges for all 17 congeners.
International Paper Pensacola Mill	Cantonment, FL	Pulp, Paper, and Paperboard	Dioxin Compounds	Facility did not recognize the dioxin distribution numbering change for the 2008 reporting period. Dioxin distribution reported in 2009 is similar to 2008 (using reporting years' numbering scheme).	Revise dioxin distribution.
Sasol North America Inc Lake Charles Chemical Complex	Westlake, LA	OCPSF	Dioxin Compounds	Facility contact provided dioxin compound sampling data. Facility contact stated that distribution and load were calculated using half the detection limit for values that were non-detect (Hayes, 2011).	Revise dioxin load (LBY) from 0.0009 to 0.0006, and revise the dioxin distribution.
Suncor Energy Commerce City Refinery	Commerce City, CO	Petroleum Refining	Dioxin Compounds	Facility contact provided dioxin compound sampling data. Facility contact stated that distribution was calculated using half the detection limit for values that were non-detect (Congram, 2011).	Revise dioxin distribution.
Charter Steel Risingsun	Risingsun, OH	Iron and Steel	Zinc and Zinc Compounds	Facility contact provided zinc sampling data and the average 2009 flow for the direct and indirect outfalls. EPA identified a conversion error in the calculations (Bukach, 2011).	Revise zinc load (LBY) from 4,570 to 4.57 for the direct discharge and 2,100,759 to 2,100 for the indirect discharge.

Table 3-3. Summary of *TRIReleases2009* Facility Review

Facility Name	Facility Location	Point Source Category	Pollutant(s) in Question	Review Findings	Actions Taken/Database Correction
Mountain State Carbon, LLC	Follansbee, WV	Iron and Steel	PACs	Facility contact provided PACs sampling data. The monitoring results provide a distribution for the PAC compounds to create a facility-specific TWF (Smith, 2011).	Revise PACs annual load (LBY) from 360 to 185. Calculate TWPE using facility-specific TWF.
Dupont Chambers Works	Deepwater, NJ	OCPSF	PACs and PCBs	EPA compared the 2009 PACs load with 2009 DMR data to determine which PAC compounds were being discharged from the facility. The 2009 DMR data confirmed that only one PAC was detected. Facility contact also stated that only one PCB (PCB-1242) was detected in sampling data (Northey, 2011).	Change PACs load (LBY) from 136 to 63.83 and PCBs load (LBY) from 0.7 to 0.18. Calculate TWPE using facility-specific TWF.
Graftech International Holdings Inc.	Columbia, TN	Carbon Black Manufacturing	PACs	Facility contact provided PACs sampling data during the 2010 Annual Reviews. The monitoring results provide a distribution for the PAC compounds to create a facility-specific TWF (Aslinger, 2010).	Calculate TWPE using facility-specific TWF.
Abitibibowater Inc. Coosa Pines Operations	Coosa Pines, AL	Pulp, Paper, and Paperboard	Dioxin Compounds	Facility contact confirmed that the pounds released were based on half the detection limit and that dioxin was not detected at the facility (Schwartz, 2011b).	Revise dioxin load to zero.

Table 3-3. Summary of *TRIReleases2009* Facility Review

Facility Name	Facility Location	Point Source Category	Pollutant(s) in Question	Review Findings	Actions Taken/Database Correction
Domtar Paper Co.	Bennettsville, SC	Pulp, Paper, and Paperboard	Dioxin Compounds	Facility contact confirmed that the pounds released were based on half the detection limit and that dioxin was not detected at the facility (Schwartz, 2011b)	Revise dioxin load to zero.
Longview Fibre Paper & Packaging Inc.	Longview, WA	Pulp, Paper, and Paperboard	Dioxin Compounds	Facility contact confirmed that the pounds released were based on half the detection limit and that dioxin was not detected at the facility (Schwartz, 2011b)	Revise dioxin load to zero.
Weylchem US Inc.	Elgin, SC	Pesticide Chemicals	Heptachlor	EPA compared the 2009 heptachlor discharges with 2009 DMR data to determine that all 2009 heptachlor concentrations were non-detect.	Revise heptachlor load to zero.
ExxonMobil Oil Corp Joliet Refinery	Channahon, IL	Petroleum Refining	Hexachlorobenzene	Facility contact confirmed that the pounds released were based on half the detection limit during the 2010 Annual Reviews (Noga, 2010).	Revise hexchlorobenzene load to zero.
John Morrell & Co.	Sioux Falls, SD	Meat and Poultry	Mercury and Mercury Compounds	Facility contact confirmed that the pounds released were based on half the detection limit during the 2010 Annual Reviews. Facility contact confirmed that all data were non-detect (Draveland, 2010).	Revise mercury load to zero.

Table 3-3. Summary of *TRIReleases2009* Facility Review

Facility Name	Facility Location	Point Source Category	Pollutant(s) in Question	Review Findings	Actions Taken/Database Correction
ExxonMobil Chemical Baton Rouge Chemical Plant	Baton Rouge, LA	OCPSF	PACs	Facility contact confirmed that the pounds released were based on half the detection limit (Graham, 2011).	Revise PACs load to zero.
H. Kramer & Co.	Chicago, IL	Nonferrous Metals Manufacturing	Phosphorus (Yellow or White)	Elemental phosphorus is not likely to be discharged by facilities, and is likely reported incorrectly.	Revise phosphorus (yellow or white) load to zero.
Lima Refining Co.	Lima, OH	Petroleum Refining	Phosphorus (Yellow or White)	Elemental phosphorus is not likely to be discharged by facilities, and is likely reported incorrectly.	Revise phosphorus (yellow or white) load to zero.
U.S. Army Pine Bluff Arsenal	Pine Bluff, AR	National Security & International Affairs	Phosphorus (Yellow or White)	Elemental phosphorus is not likely to be discharged by facilities, and is likely reported incorrectly.	Revise phosphorus (yellow or white) load to zero.

3.4.5 Trends in TRI Data

EPA has identified a consistent decrease every year since 2002 in the total number of facilities reporting to TRI. EPA also identified a consistent decrease in the number of facilities reporting discharges to TRI from 2002 to 2007. However, the number of facilities reporting discharges to TRI increased from 2007 to 2009. Table 3-4 illustrates the trends since 2002.

Table 3-4. Number of Facilities with Data in TRI for Reporting Years 2002 Through 2009

Reporting Year	Number of Facilities Reporting to TRI	Number of Facilities Reporting Discharges to TRI
2002	24,379	8,291
2003	23,811	8,051
2004	23,675	7,930
2005	23,461	7,837
2006	22,880	7,506
2007	21,965	6,572
2008	21,694	6,891
2009	20,797	7,012

Source: TRIReleases2002; TRIReleases2003; TRIReleases2004; TRIReleases2005; TRIReleases2006; TRIReleases2007; TRIReleases2008; and TRIReleases2009.

EPA does not have sufficient information to determine the cause of the decrease in the number of facilities reporting to TRI over the past eight years. The aggregate number of establishments[4] reported to the U.S. Economic Census increased from 2002 to 2007. No changes in reporting requirements occurred that can be attributed to the decrease. EPA will continue to monitor this change in the future.

3.5 *TRIReleases2009* Rankings and *DMRLoads2009* Rankings

After incorporating the changes discussed in Sections 3.3 and 3.4, EPA generated the final versions of the *TRIReleases* and *DMRLoads* databases used for the 2011 toxicity rankings analysis: *TRIReleases2009_v2* and *DMRLoads2009_v2*. Tables C-1 and C-2 in Appendix C present the category rankings by TWPE from the *TRIReleases2009_v2* and *DMRLoads2009_v2* databases, respectively. The category rankings presented in these tables reflect all the corrections made during the 2011 toxicity rankings analyses. Tables C-3 and C-4 in Appendix C present the six-digit NAICS code rankings by TWPE from *TRIReleases2009_v2* and the four-digit SIC code rankings by TWPE from *DMRLoads2009_v2*, respectively. Tables C-5 and C-6 in Appendix C present the chemical rankings by TWPE from *TRIReleases2009_v2* and *DMRLoads2009_v2*, respectively. For a summary of the final rankings and the findings of the 2011 Annual Reviews, see Section 4 of the Preliminary 2012 Plan (U.S. EPA, 2013).

Also, in Table 8-1 of the Preliminary 2012 Plan, EPA summarizes its conclusions from the annual reviews about each of the 57 point source categories discharges (U.S. EPA, 2013). EPA uses the following codes to describe the results for each industrial category:

[4] EPA reviewed only 3-digit NAICS code industry groups that were eligible for TRI reporting. Refer to Chapter 2 of the 2009 SLA Report (EPA, 2009) for more detail.

1. Effluent guidelines or pretreatment standards for this industrial category were recently revised through an effluent guidelines rulemaking, or a rulemaking is currently underway. Or, EPA recently completed a preliminary study or a detailed study, and no further action is necessary at this time.

2. Revising the national effluent guidelines or pretreatment standards is not the best tool for this industrial category because most of the toxic and non-conventional pollutant discharges result from one or a few facilities in this industrial category. EPA will consider assisting permitting authorities in identifying pollution control and pollution prevention technologies for the development of technology-based effluent limitations during the development of individual permits.

3. Not identified as a priority based on data available at this time (e.g., not among industries that cumulatively compose 95% of discharges as measured in units of TWPE).

4. EPA intends to start or continue a detailed study of this industry in its 2012 Annual Reviews to determine whether to identify the category for effluent guidelines rulemaking.

5. EPA is continuing to assess pollutant discharges using screening-level data because incomplete data are currently available to determine whether to conduct a detailed study or identify the category for possible revision. Additional quality review on the pollutant discharges, applicable facilities, and potential wastewater treatment options needs to be reviewed prior to conducting a detailed study.

6. EPA is identifying this industry for a revision of an existing effluent guideline.

3.6 Methodology, Data Sources, and Limitations References

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4. ALUMINUM FORMING (40 CFR PART 467)

EPA selected the Aluminum Forming Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. This section summarizes the results of the 2011 Annual Reviews associated with the Aluminum Forming Category, which focused on discharges of lead from one facility, because of its high TWPE relative to the other facilities in the Aluminum Forming Category.

4.1 Aluminum Forming Category 2011 Toxicity Rankings Analysis

Table 4-1 compares the toxicity rankings analysis results for the Aluminum Forming Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases decreased from discharge years 2002 to 2007 and increased slightly from 2007 to 2009. The estimated 2009 DMR TWPE accounts for approximately 85 percent of the combined 2009 DMR and TRI TWPE, similar to previous years of data.

Table 4-1. Aluminum Forming Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Aluminum Forming Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	940,000[c]	61,500	1,000,000[c]
2004	2007	3,320	27,600	309,000
2005	2008	3,260	NA	NA
2007	2009	2,710	12,200	14,900
2008	2010	5,830	32,800	38,700
2009	2011	5,920	33,800	39,700

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

a Discharges include transfers to POTWs and account for POTW removals.

b DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

c In the 2006 Annual Reviews, EPA excluded the TWPE for TRI-reported discharges of PCBs from Kaiser Aluminum & Chemical Corporation in Spokane, WA, because a) the estimated release reported to TRI appeared to be an error, b) PCBs are no longer in commerce and therefore not regulated by ELGs, and c) the PCB discharges did not represent the category as a whole. Removing the TRI TWPE, reduced the TRI TWPE from 940,000 to 5,238 TWPE. As a result, the Aluminum Forming Category ranked 22nd, outside the categories EPA prioritized for review. See the 2005 Annual Screening-Level Analysis: Supporting the Annual Review of Existing Effluent Limitations Guidelines and Standards and Identification of Potential New Categories for Effluent Limitations Guidelines and Standards (U.S. EPA, 2005).

NA: Not applicable. EPA did not evaluate DMR data for 2005.

4.2 Aluminum Forming Category Pollutants of Concern

EPA's review of the Aluminum Forming Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 4-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3*, respectively).

Table 4-2. Aluminum Forming Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Lead	1	6	28,800	1	7	24,800
Cyanide	4	8	173	2	8	6,080
Aluminum	2	17	1,950	3	17	1,490
Fluoride	3	4	1,430	4	4	1,090
Zinc	Pollutant not reported in the top five 2008 DMR-reported pollutants.			5	20	124
Polychlorinated biphenyls (PCBs)	5	1	93	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Aluminum Forming Category Total	**NA**	**23[b]**	**32,800**	**NA**	**23[b]**	**33,800**

Source: *DMRLoads2008_v3* and *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

Lead is the top DMR-reported pollutant in 2008 and 2009 contributing more than 73 percent of the 2009 DMR category TWPE. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they represent less than 27 percent of the 2009 DMR TWPE for the Aluminum Forming Category.

4.3 Aluminum Forming Category Lead Discharges in DMR

Table 4-3 presents the facilities that account for the lead discharges in the 2009 and 2008 DMR databases. The majority (98 percent) of the lead discharges in the 2009 DMR database were from Alcan Rolled Products in Ravenswood, WV. The other five facilities account for the remaining two percent. Accordingly, EPA's review of the lead discharges in DMR focused on Alcan Rolled Products.

Table 4-3. Top Lead Discharging Facilities in 2008 and 2009 DMR Databases

Facility Name	Facility Location	2008[a]			2009[a]		
		Pounds of Lead Discharged	Lead TWPE	Percentage of Aluminum Forming Category's 2008 DMR Lead TWPE	Pounds of Lead Discharged	Lead TWPE	Percentage of Aluminum Forming Category's 2009 DMR Lead TWPE
Alcan Rolled Products	Ravenswood, WV	12,800	28,700	>99%	10,800	24,300	98%
Remaining facilities reporting lead discharges[b]	NA	51	114	<1%	238	533	2%
Total		**12,900**	**28,800**	**100%**	**11,100**	**24,800**	**100%**

Source: DMRLoads2008_v3 and DMRLoads2009_v2.

a Major and minor dischargers.

b There are five remaining facilities that have lead discharges in the 2009 DMR database, which account for 2 percent of the category's lead DMR TWPE.

As part of the 2011 Annual Reviews, EPA contacted the West Virginia Department of Environmental Protection (WV DEP) about the lead discharges from Alcan Rolled Products. WV DEP stated that all lead measurements for 2009 found levels below detection. WV DEP accordingly reported 5 micrograms per liter (µg/L) in their DMRs, half of lead's minimum detection limit of 10 µg/L (Clevenger, 2011).[5] Based on this data, EPA determined that all the lead concentrations were below detectable levels in 2009. As described in Section 3, EPA zeroes the load when all concentrations of a specific pollutant are BDL for the year. By zeroing the lead discharge for Alcan Rolled Products, the total DMR TWPE decreases from 33,800 to 9,530.

4.4 Aluminum Forming Category Conclusions

The estimated toxicity of the Aluminum Forming Category discharges results mainly from the lead discharges of one facility (accounting for 61 percent of the category's 2009 combined TWPE). Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- One facility, Alcan Rolled Products, accounted for 98 percent of the 2009 DMR lead TWPE. WV DEP indicated the facility did not detect lead but reported the concentration as half the detection limit without the BDL indicators. Because all the lead concentrations were non-detect, EPA zeroed the load and TWPE in the *DMRLoads2009* database.

- Correcting the BDL indicators for lead decreases the 2009 DMR TWPE to 9,530, making the category's 2009 combined TWPE 15,500. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

4.5 Aluminum Forming Category References

1. Clevenger, Renee. 2011. Notes From Telephone Communication Between Renee Clevenger, West Virginia Department of Environmental Protection (WVDEP), and Kimberly Landick, Eastern Research Group, Inc., Re: 2009 DMR Lead Discharges. (May 5). EPA-HQ-OW-2010-0824. DCN 07561.

2. U.S. EPA. 1994. Method 200.7 Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emissions Spectrometry. Revision 4.4. (Cincinnati, OH). Available online at:

[5] WV DEP indicated that the minimum detection limit was 10 milligrams per liter (Clevenger, 2011). EPA believes WV DEP meant 10 µg/L because the facility's permit requires lead reported in µg/L (WV DEP, 2002) and the method detection limit for EPA Method 200.7 is 10 µg/L (U.S. EPA, 1994).

http://water.epa.gov/scitech/methods/cwa/bioindicators/upload/2007_07_10_methods_method_200_7.pdf. EPA-HQ-OW-2010-0824. DCN 07562.

3. U.S. EPA. 2005. 2005 Annual Screening-Level Analysis: Supporting the Annual Review of Existing Limitations Guidelines and Standards and Identification of Potential New Categories for Effluent Limitations Guidelines and Standards. (Washington, D.C). (August). EPA-821-B-05-003. EPA-HQ-OW-2004-0032-0901.

4. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

5. WV DEP. 2002. West Virginia Department of Environmental Protection. NPDES Permit: Pechiney Rolled Products, LLC, Ravenswood, WV. (December 30). EPA-HQ-OW-2010-0824. DCN 07563.

5. CENTRALIZED WASTE TREATMENT (40 CFR PART 437)

EPA selected the Centralized Waste Treatment (CWT) Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. EPA previously reviewed discharges from the CWT Category as part of the 2007 and 2008 Annual Reviews (U.S. EPA, 2007, 2008). This section summarizes the results of the 2011 Annual Reviews associated with the CWT Category, which focused on discharges of hexachlorobenzene from one facility, because of its high TWPE relative to the other facilities in the CWT Category.

5.1 CWT Category 2011 Toxicity Rankings Analysis

Table 5-1 compares the toxicity rankings analysis results for the CWT Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases decreased from discharge years 2004 to 2008 and increased from 2008 to 2009. The estimated 2009 DMR TWPE accounts for approximately 79 percent of the combined 2009 DMR and TRI TWPE, similar to recent years of data.

Table 5-1. CWT Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	CWT Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	38,100	3,420	41,500
2004	2007	7,460,000	8,730	7,470,000
2005	2008	4,280,000	NA	NA
2007	2009	3,790	30,900	34,700
2008	2010	6,850	20,300	27,200
2009	2011	10,500	40,500	51,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

a Discharges include transfers to POTWs and account for POTW removals.

b DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

5.2 CWT Category Pollutants of Concern

EPA's review of the CWT Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 5-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3,* respectively).

Hexachlorobenzene is the top DMR pollutant in 2009, contributing to more than 78 percent of the 2009 DMR category TWPE. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they represent less than 22 percent of the combined 2009 DMR and TRI TWPE for the CWT Category.

Table 5-2. CWT Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Hexachlorobenzene	Pollutant not reported in the top five 2008 DMR-reported pollutants.			1	1	31,400
Sulfur	2	2	3,960	2	2	3,360
Benzo(a)pyrene	Pollutants not reported in the top five 2008 DMR-reported pollutants.			3	1	1,590
PCB-1242				4	1	535
Chrysene				5	1	501
Chlordane	1	1	7,540	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
Cyanide	3	7	1,660			
Silver	4	3	1,270			
Acrylonitrile	5	2	1,100			
CWT Category Total	**NA**	**9[b]**	**20,300**	**NA**	**9[b]**	**40,500**

Sources: *DMRLoads2008_v3* and *DMRLoads2009_v2*.

a DMR data include major and minor dischargers.

b Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

5.3 CWT Category Hexachlorobenzene Discharges in DMR

Clean Harbors Baton Rouge, LLC (Clean Harbors), in Baton Rouge, LA, accounts for all of the CWT Category's hexachlorobenzene discharges in the 2009 DMR database. Clean Harbors reports hexachlorobenzene discharges as a quantity (i.e., pounds per day), which is calculated using the measured concentration and flow. Table 5-3 presents Clean Harbors' monthly hexachlorobenzene quantities for 2007 through 2010. All monthly values are below the detection limit except for December 2009.

As part of the 2011 Annual Reviews, EPA contacted the facility about the December 2009 hexachlorobenzene quantity. The facility contact stated that they had measured hexachlorobenzene at levels below detection, but a laboratory dilution factor error had caused the detection limit to be 400 micrograms per liter (µg/L), 40 times the usual value. Because the value could thus have been anywhere between 0 and 399 µg/L, the facility reported the hexachlorobenzene quantity using the highest possible concentration (399 µg/L) and explained the laboratory's error in its cover letter with the DMR data (Clark, 2011). The facility contact also stated that besides December 2009, hexachlorobenzene was always measured at levels below detection (Clark, 2011), as shown in Table 5-3.

As a result, EPA determined that it was appropriate to modify the *DMRLoads2009* database by adding the below detection limit (BDL) indicator to the December 2009 hexachlorobenzene discharge, which zeros the facility's 2009 hexachlorobenzene TWPE and decreases the CWT Category's 2009 combined TWPE to 19,600.

Table 5-3. 2007–2010 Monthly Hexachlorobenzene Discharges for Clean Harbors Baton Rouge as Reported in Discharge Monitoring Reports

Month	Quantity (lbs/day)			
	2007	2008	2009	2010[a]
January	< 0.051	< 0.051	< 0.051	< 0.101
February	< 0.05	< 0.051	< 0.05	< 0.026
March	< 0.05	< 0.05	< 0.039	0
April	< 0.051	< 0.05	< 0.048	0
May	< 0.051	< 0.05	< 0.051	0
June	< 0.05	< 0.025	< 0.026	< 0.02
August	< 0.05	< 0.025	No discharge	0
July	< 0.05	< 0.025	< 0.05	0
September	< 0.05	No discharge	< 0.049	0
October	< 0.05	< 0.027	< 0.027	< 0.02
November	No discharge	< 0.05	< 0.026	0
December	< 0.05	No discharge	0.317	No discharge

Sources: Envirofacts; DMRLoads2007_v4; DMRLoads2008_v3; and DMRLoads2009_v2.

[a] 2010 data were pulled from Envirofacts.

5.4 CWT Category Conclusions

The estimated toxicity of the CWT Category discharges results mainly from the hexachlorobenzene discharges of one facility (accounting for 62 percent of the category's 2009 combined TWPE). Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- The hexachlorobenzene discharges are from one facility, Clean Harbors Baton Rouge, LLC. The facility measured its December 2009 concentration at levels below detection but reported the quantity without the BDL indicator because a laboratory error caused the detection limit to be 400 µg/L (Clark, 2011). For toxicity rankings analysis database purposes, EPA determined that the BDL indicator should be added to the concentration, which zeros the hexachlorobenzene discharges.

- Correcting the BDL indicator for hexachlorobenzene decreases the 2009 DMR TWPE to 9,100, making the category's 2009 combined TWPE 19,600. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

5.5 CWT Category References

1. Clark, Billy. 2011. Notes From Telephone Communication with Billy Clark, Clean Harbors Baton Rouge, LLC, and Kimberly Landick, Eastern Research Group, Inc., Re: 2009 DMR Hexachlorobenzene Discharges. (May 5). EPA-HQ-OW-2010-0824. DCN 07565.

2. U.S. EPA. 2007. *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan.* Washington, D.C. (October). EPA 821-R-07-007. EPA-HQ-OW-2006-0771-0819.

3. U.S. EPA. 2008. *Technical Support Document for the 2008 Effluent Guidelines Program Plan.* Washington, D.C. (August). EPA 821-R-08-015. EPA-HQ-OW-2006-0771-1701.

4. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

6. COAL MINING (40 CFR PART 434)

EPA identified the Coal Mining Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. This industry was reviewed previously in EPA's Preliminary and Final Effluent Guidelines Program Plans from 2004 to 2006 (U.S. EPA, 2004, 2005, 2006). EPA also conducted a detailed study of the Coal Mining Category during the 2007 and 2008 Annual Reviews (U.S. EPA, 2008). This section summarizes the results of the 2011 Annual Reviews associated with the Coal Mining Category. EPA focused on discharges of manganese and iron because of their high TWPE relative to the rest of the Coal Mining Category.

6.1 Coal Mining Category Toxicity Rankings Analysis

Table 6-1 compares the toxicity rankings analysis results for the Coal Mining Category from 2006 through 2011. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases increased using 2008 data because the 2002 through 2007 DMR databases excluded minor dischargers. The DMR and TRI database TWPE decreased from discharge year 2008 to 2009.

Table 6-1. Coal Mining Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Coal Mining Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	3,120	1,910	5,030
2004	2007	1,190	2,490	3,680
2005	2008	745	NA	NA
2007	2009	493	2,290	2,780
2008	2010	1,280	76,400	77,700
2009	2011	1,010	65,800	66,800

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 only include major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

It is important to note that discharges for the majority of coal mines are not included in the TRI or DMR databases. There are over 1,000 active coal mines in the U.S. (U.S. EPA, 2008). TRI contains data for facilities in certain SIC codes, including those for coal mining (1221, 1222, and 1231). However, only coal mines with at least 10 full-time employees or their equivalent, and that manufacture, use, or otherwise process certain chemicals at or above an activity threshold report to TRI (U.S. EPA, 2009). The 2008 Coal Mining Detailed Study found that only 21 coal mines had data in TRI (U.S. EPA, 2008). For DMR data, many states classify discharges from coal mines as "minor dischargers" and, as a result, do not enter DMR data into EPA's ICIS-NPDES or PCS systems. EPA's 2008 Detailed Study for the Coal Mining Point Source Category found that less than one-fourth of the coal mines were represented in the EPA's DMR storage system (U.S. EPA, 2008).

6.2 Coal Mining Manufacturing Category Pollutants of Concern

EPA's review of the Coal Mining Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 6-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3,* respectively).

Manganese and iron are the top two DMR pollutants in 2009, contributing more than 77 percent of the total category TWPE. Manganese and iron were also the top pollutants in the 2008 DMR database and were reviewed as part of the Coal Mining Detailed Study during the 2007 and 2008 Annual Reviews (U.S. EPA, 2008). EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they represent a small percentage (less than 23 percent) of the 2009 DMR TWPE for the Coal Mining Category.

Table 6-2. Coal Mining Manufacturing Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Manganese	1	46	80,900	1	57	36,000
Iron	2	133	11,900	2	151	14,600
Mercury	Pollutant not reported in the top five 2009 DMR-reported pollutants.			3	4	6,190
Sulfate	4	36	8,550	4	52	3,630
Chloride	3	33	8,810	5	48	3,360
Magnesium	5	2	1,130	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Coal Mining Category Total	**NA**	**137[b]**	**112,000**	**NA**	**166[b]**	**65,800**

Sources: *DMRLoads2008_v3* and *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

6.3 Coal Mining Category Iron and Manganese Discharges in DMR

Table 6-3 presents the Coal Mining Effluent Limitations Guidelines (ELGs) limits for manganese and iron for the Acid or Ferruginous Mine Drainage subcategory (Subcategory C). See Section 4 of the Coal Mining Detailed Study for additional details on the Coal Mining ELGs (U.S. EPA, 2008).

Table 6-3. Coal Mining ELGs Subpart C Manganese and Iron Limits

Subpart C	Manganese Limits		Iron Limits	
	Daily Maximum (mg/L)	Monthly Average (mg/L)	Daily Maximum (mg/L)	Monthly Average (mg/L)
BPT/BAT	4	2	7	3.5
NSPS	4	2	6	3

Source: Coal Mining Point Source Category BPT, BAT, BCT Limitations and New Source Performance Standards—40 CFR Part 434.

BAT: Best available technology economical achievable.

BPT: Best practicable control technology.

NSPS: New source performance standards.

Table 6-4 presents the facilities that account for the manganese and iron compound discharges in the 2009 DMR database. Forty-six percent of the manganese and iron discharges are from the top facility, Freeman United Coal–Industry. The next two facilities, Freeman United Coal–Crown 2 and Freeman United Coal–Crown 3, account for 28 percent of the manganese and iron discharges. EPA did not investigate the remaining facilities discharging manganese and/or iron as part of the 2011 Annual Reviews.

Table 6-4. Top Manganese and Iron Discharging Facilities in the 2009 DMR Database

Facility Name	Facility Location	Pounds of Manganese and Iron Discharged	Manganese and Iron TWPE	Percentage of Coal Mining Category's 2009 DMR Manganese and Iron TWPE
Freeman United Coal–Industry	Industry, IL	1,570,000	23,100	46%
Freeman United Coal–Crown 2	Virden, IL	212,000	10,500	21%
Freeman United Coal–Crown 3	Farmersville, IL	93,800	3,400	7%
Remaining Facilities Reporting Manganese or Iron Discharges[a]		1,250,000	13,600	27%
Total		**3,120,000**	**50,600**	**100%**

Source: DMRLoads2009_v2.

[a] There are 205 remaining facilities that have manganese and/or iron discharges in the 2009 DMR database, which account for 27 percent of the category's manganese and iron DMR TWPE.

Freeman United Coal–Industry

Freeman United Coal–Industry in Industry, IL, is the top manganese and iron discharging facility. Freeman United Coal–Industry discharges manganese and iron from 12 outfalls. In reviewing the facility's 2009 flows, EPA noted that eight of the outfalls had listed flows in 2009 that were 1,000 times greater than in other years. Because previous year's data show a consistent difference in the order of magnitude, EPA assumed that a units error caused the increase in flow. Assuming this to be an error, EPA corrected those eight outfalls' flows to be on the same order of magnitude as the other four outfalls' flow. Table 6-5 presents the original and corrected flows, along with the original and corrected iron and manganese TWPE. Using the corrected flows, the facility's iron and manganese TWPE decreases to 270 and its overall total TWPE decreases from 24,400 to 1,510.

Table 6-5. Freeman United Coal–Industry 2009 Original DMR and Corrected Flow Discharges

Outfall	Original Flow (MGD)	Corrected Flow (MGD)	TWPE			
			Original Iron	Corrected Iron	Original Manganese	Corrected Manganese
002	67.9	0.0679	685	1.03	9,130	13.8
003	8.61	0.00861	88.1	0.105	611	0.738
009	0.148	NC	2.05	NC	49	NC
018	0.035	NC	0.431	NC	36.1	NC
019	0.062	NC	0	NC	157	NC
24W	0.0283	NC	0.426	NC	8.31	NC
026	15.3	0.0153	326	0.391	5,640	6.80
029	8.1	0.0081	162	0.195	NA	NA
030	69.9	0.0699	312	0.375	NA	NA
031	30.4	0.0304	5,140	5.14	NA	NA
032	4	0.004	86.3	0.086	NA	NA
033	15.3	0.0153	723	2.17	NA	NA
Total TWPE			**7,520**	**12.4**	**15,600**	**272**

Sources: *DMRLoads2009_v2* and coal mining supporting calculations (ERG, 2011).
NA: Not applicable. Facility did not report manganese discharges for these outfalls.
NC: No change. EPA did not correct the flow for this outfall because the order of magnitude matched flows from previous years.

In addition to the flow corrections, EPA identified that some of Freeman United Coal–Industry's manganese and iron discharges were above their proposed permit limits, which are equivalent to or more stringent than the ELGs. The proposed limits are from an October 2010 public notice on the facility's NPDES permits (IL EPA, 2010) and may not reflect the limits in place in 2009.

Table 6-6 presents the ranges of manganese and iron concentrations, the proposed permit limits, and the percent of concentrations that are above the proposed permit limits for each outfall. For manganese, approximately 64 percent of the monthly average concentrations and 72 percent of the daily maximum concentrations are above the proposed permit limits. For iron, approximately 8 percent of the monthly average concentrations and 2 percent of the daily maximum concentrations were above the proposed permit limits. As shown in Table 6-6, Freeman United Coal–Industry's manganese and iron discharges exceed the proposed permit limits. Additionally, the ranges of manganese and iron concentrations exceed the ELG limits listed for the subcategory in Table 6-3, which are less stringent than the proposed permit limits below. Permit exceedances do not warrant the need for further regulation but rather better facility-specific compliance support.

Table 6-6. Freeman United Coal–Industry's 2009 Manganese and Iron Concentrations

Outfall	Monthly Average Concentrations (mg/L)			Daily Maximum Concentrations (mg/L)		
	Range	Proposed Permit Limits[a]	Percentage Above Proposed Permit Limits	Range	Proposed Permit Limits[a]	Percentage Above Proposed Permit Limits
Manganese Discharges						
002	0.248–1.76	1	38%	0.248–1.81	1	38%
003	0.102–1.04	1	10%	0.13–1.64	1	20%
009	0.266–2.69	1	67%	0.648–3.26	1	92%
018	1.33–13.6	1	100%	1.96–14.1	1	100%
019	0.49–59	1	83%	0.49–61	1	92%
024W	0.411–3.53	1	58%	0.479–3.53	1	58%
026	0.284–4.71	1	80%	0.54–8.6	1	90%
Manganese Discharges for All Outfalls	**0.102–59**		**64%**	**0.13–61**		**72%**
Iron Discharges						
003[b]	0.07–1.8	3.5	0%	0.09–3.33	7	0%
009[b]	0.137–5.79	3.5	7%	0.18–5.79	7	0%
018[b]	0.219–2.48	3.5	0%	0.3–3.69	7	0%
019[b]	1.5–1.5	3.5	0%	1.5–1.5	7	0%
024W	0.091–4.82	3	7%	0.321–4.82	6	0%
026	0.198–3.33	3	10%	0.24–5.86	6	0%
029	0.376–2.36	3	0%	0.557–3.74	6	0%
030	0.093–1.26	3	0%	0.099–3.21	6	0%
031	2.31–11.9	3	67%	4.33–15.4	6	33%
032	0.381–1.57	3	0%	0.628–3.99	6	0%
033	8.13–8.13	3	100%	12.8–12.8	6	100%
Iron Discharges for All Outfalls	**0.07–11.85**		**8%**	**0.09–15.4**		**2%**

Source: DMRLoads2009_v2.

[a] The proposed permit limits are listed in the public notice for their future permit (IL EPA, 2010).

[b] These outfalls are permitted using the 40 CFR Part 434 Subpart C BAT limits because discharges began before July 27, 1987 (IL EPA, 2010).

Freeman United Coal–Crown 2

Freeman United Coal–Crown 2 in Virden, IL, is the second top manganese and iron discharging facility. Freeman United Coal–Crown 2 discharges manganese and iron from outfall 001. As part of the 2011 Annual Reviews, EPA contacted the facility about their 2009 flows and received corrected data from the facility contact. Table 6-7 presents the original and corrected flows, along with the original and corrected iron and manganese TWPE. Using the corrected flows, the facility's iron and manganese TWPE decreases to 836. This will decrease the facility's overall total TWPE from 12,100 to 961.

Table 6-7. Freeman United Coal–Crown 2 2009 Original DMR and Corrected Flow Discharges

Outfall	Original Flow (MGD)	Corrected Flow (MGD)	TWPE			
			Original Iron	Corrected Iron	Original Manganese	Corrected Manganese
Crown 2						
001	82.5	2.38	381	30.2	10,100	805

Sources: *DMRLoads2009_v2*; facility contact (Austin, 2011); and coal mining supporting calculations (ERG, 2011).

Freeman United Coal–Crown 3

Freeman United Coal–Crown 3 in Industry, IL, is the third top manganese and iron discharging facility. Freeman United Coal–Crown 3 discharges manganese and iron from two outfalls, 001 and 002. As part of the 2011 Annual Reviews, EPA contacted the facility about their 2009 flows and received corrected data from the facility contact. Table 6-8 presents the original and corrected flows, along with the original and corrected iron and manganese TWPE. Using the corrected flows, the facility's iron and manganese TWPE decreases to 6.37. This will decrease the facility's overall total TWPE from 6,230 to 11.8.

Table 6-8. Freeman United Coal – Crown 3 2009 Original DMR and Corrected Flow Discharges

Outfall	Original Flow (MGD)	Corrected Flow (MGD)	TWPE			
			Original Iron	Corrected Iron	Original Manganese	Corrected Manganese
Crown 3						
001	0.166	116	208	0.385	2,350	5.81
002	0.042	29.5	67.6	0.175	NA	NA
Total TWPE			**276**	**0.559**	**2,350**	**5.81**

Sources: *DMRLoads2009_v2;* facility contact (Austin, 2011); and coal mining supporting calculations (ERG, 2011).
NA: Not applicable. Facility did not report manganese discharges for these outfalls.

6.4 Coal Mining Pollutants Not Currently Regulated by Part 434

Some states and stakeholders have identified concerns with pollutants beyond those regulated in Part 434. For example, West Virginia regulates aluminum, selenium, and TDS in coal mining drainage based on state water quality criteria. The *2008 Coal Mining Detailed Study* identified data on pollutants of concern not regulated by Part 434, including aluminum, cadmium, selenium, and total dissolved solids/conductivity (U.S. EPA, 2008).

6.5 Coal Mining Category Conclusions

The estimated toxicity of the Coal Mining Category discharges resulted from manganese and manganese compounds and iron and iron compounds. Data collected for the 2011 Annual Reviews demonstrate that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- One facility, Freeman United Coal–Industry, accounts for 46 percent of the category's manganese and iron 2009 DMR discharges. EPA determined that some of the facility's outfalls had listed flows that were 1,000 times greater in 2009 than in other years. Correcting the flows results in a reduction in the facility's TWPE from 24,400 to 1,510. Additionally, more than 64 percent of the manganese discharges and 2 percent of the iron discharges exceed the facility's proposed permit limits, which are equivalent to or more stringent than the ELGs. Permit limit exceedances do not warrant the need for further regulation but rather better facility-specific compliance support. As new data become available, EPA will review the manganese and iron discharges from Freeman United Coal–Industry to determine if the same conclusion applies.

- Freeman United Coal–Crown 2 and Freeman United Coal–Crown 3 account for 21 percent and 7 percent of the category's manganese and iron 2009 DMR discharges, respectively. EPA determined that there was an error in the flows for both facilities, which the facility contact corrected. Correcting the flows for both facilities results in a reduction in the TWPE from 12,100 to 961 for Freeman United Coal–Crown 2 and 6,230 to 11.8 for Freeman United Coal–Crown 3.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 Coal Mining Category TWPE from 66,800 to 26,600. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

- Based solely on the 2011 toxicity ranking analysis, the Coal Mining category would be ranked a lower priority for revision. However, the Coal Mining Category (Part 434) is under represented in the databases EPA uses in the toxicity ranking analysis. Furthermore, Part 434 currently only regulates pH, total suspended solids, iron, and manganese; while coal mine drainage also contains elevated levels of aluminum, selenium, and total dissolved solids.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

6.6 Coal Mining Category References

1. Austin, Thomas. 2011. Telephone and Email Communication with Thomas Austin, Freeman United Coal, and Elizabeth Sabol, Eastern Research Group, Inc., Re: 2009 DMR Flow Discharges. (June 30). EPA-HQ-OW-2010-0824. DCN 07580.

2. ERG. 2011. Eastern Research Group, Inc. *Coal Mining Supporting Calculations.* (July). EPA-HQ-OW-2010-0824. DCN 07581.

3. IL EPA. 2010. Illinois Environmental Protection Agency. *NPDES Permit: Springfield Coal Company, Industry, IL.* (October 13). EPA-HQ-OW-2010-0824. DCN 07582.

4. U.S. EPA. 2004. *Technical Support Document for the 2004 Effluent Guidelines Program Plan*. EPA-821-R-04-014. Washington, D.C. (August). EPA-HQ-OW-2003-0074-1346 through 1352.

5. U.S. EPA. 2005. *Preliminary 2005 Review of Prioritized Categories of Industrial Dischargers*. EPA-821-B-05-004. Washington, D.C. (August). EPA-HQ-OW-2004-0032-0016.

6. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. EPA-821-R-06-018. Washington, D.C. (December). EPA-HQ-OW-2004-0032-2782.

7. U.S. EPA. 2008. Coal Mining Detailed Study. EPA-821-R-08-012. Washington, D.C. (August). EPA-HQ-OW-2006-0771-1695.

8. U.S. EPA. 2009. Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories. EPA-821-R-09-007. Washington, DC. (October). EPA-HQ-OW-2008-0517-0515.

9. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

7. FERTILIZER MANUFACTURING (40 CFR PART 418)

EPA selected the Fertilizer Manufacturing Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. EPA has reviewed facility discharges from this category in past years of review (2004–2009) (U.S. EPA, 2004, 2005, 2006, 2007, 2008, 2009). The Final 2010 Plan summarizes the results of EPA's review of this industry in 2010 (U.S. EPA, 2011). This section summarizes the results of the 2011 Annual Reviews, which focused on discharges of fluoride from two facilities due to their high TWPE relative to the other facilities in the Fertilizer Manufacturing Category.

7.1 Fertilizer Manufacturing Category 2011 Toxicity Rankings Analysis

Table 7-1 compares the toxicity rankings analysis results for the Fertilizer Manufacturing Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases decreased from discharge years 2002 to 2008 and increased slightly from 2008 to 2009. The estimated 2009 DMR TWPE accounts for approximately 99 percent of the combined 2009 DMR and TRI TWPE, similar to previous years of data.

Table 7-1. Fertilizer Manufacturing Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Fertilizer Manufacturing Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	9,100	1,370,000	1,380,000
2004	2007	10,800	1,170,000	1,180,000
2005	2008	7,300	NA	NA
2007	2009	4,460	1,095,000	1,100,000
2008	2010	8,120	818,000	826,000
2009	2011	9,550	902,000	912,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA – Not applicable. EPA did not evaluate DMR data for 2005.

7.2 Fertilizer Manufacturing Category Pollutants of Concern

EPA's review of the Fertilizer Manufacturing Category focused on the 2009 DMR discharges because the 2009 DMR data dominates the category's combined TWPE. Table 7-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3*, respectively).

Table 7-2. Fertilizer Manufacturing Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Fluoride	1	3	778,000	1	3	875,000
Aluminum	3	1	13,300	2	1	16,700
Cadmium	4	1	6,710	3	2	6,580
Ammonia as nitrogen	2	27	16,000	4	24	1,700
Nitrogen	Pollutant not reported in the top five 2009 DMR-reported pollutants.			5	13	605
2,4-dichlorophenoxyacetic acid	5	1	1,750	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Fertilizer Manufacturing Category Total	**NA**	**36[b]**	**818,000**	**NA**	**31[b]**	**902,000**

Sources: *DMRLoads2008_v3*; and *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA – Not applicable.

Fluoride is the top DMR-reported pollutant in 2008 and 2009, contributing more than 99 percent of the total category TWPE. Fluoride was also the primary reason for the review using 2004 and 2007 DMR data (U.S. EPA, 2007; U.S. EPA, 2009). EPA did not investigate the other top pollutants as part of the 2010 or 2011 Annual Reviews because the other pollutants represent a small percentage (less than one percent) of the combined 2009 DMR and TRI TWPE for the Fertilizer Manufacturing Category.

7.3 Fertilizer Manufacturing Category Fluoride Discharges in DMR

Table 7-3 presents three facilities that account for all of the fluoride discharges in the 2009 and 2008 DMR databases. The majority (99 percent) of the fluoride discharges in 2009 were from Mosaic Fertilizers, LLC, in Uncle Sam, LA, and IMC Phosphates in St. James, LA. The other facility, Mississippi Phosphates Corporation in Pascagoula, MS, accounts for the remaining one percent. These facilities generate wastewater-containing fluoride while manufacturing wet-process phosphoric acid, which is used in phosphatic fertilizer manufacturing (U.S. EPA, 1974). See the *Technical Support Document for the 2006 Effluent Guidelines Program Plan* (U.S. EPA, 2006) for descriptions of the wet-process phosphoric acid process (Section 8.5.1), wastewater sources of fluoride (Section 8.5.2), and wastewater treatment of fluoride (Section 8.5.3).

Table 7-3. Top Fluoride-Discharging Facilities in 2008 and 2009 DMR Databases

Facility Name	Facility Location	2008[a]			2009[a]		
		Pounds of Fluoride Discharged	Fluoride TWPE	Percentage of Fertilizer Manufacturing Category's 2008 DMR Fluoride TWPE	Pounds of Fluoride Discharged	Fluoride TWPE	Percentage of Fertilizer Manufacturing Category's 2009 DMR Fluoride TWPE
Mosaic Fertilizer, LLC	Uncle Sam, LA	23,500,000	705,000	91%	27,200,000	816,000	93%
IMC Phosphates Co.	St James, LA	2,000,000	59,900	8%	1,500,000	46,400	5%
Mississippi Phosphates Corp.	Pascagoula, MS	452,000	13,600	1%	414,000	12,400	1%
Total		**25,900,000**	**778,000**	**100%**	**29,200,000**	**875,000**	**100%**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.

[a] Major and minor dischargers.

Both of the top facilities in the Fertilizer Manufacturing Category are phosphate fertilizer manufacturers. Phosphate fertilizer manufacturers are subject to 40 CFR Part 418 Subpart A, "Phosphate Subcategory." Subpart A BAT includes limits on flow-based surge capacity and pollutant discharge concentrations. The flow-based requirements (U.S. EPA, 1974) are:

- Zero discharge of wastewater except from the gypsum storage and disposal area.
- Maintenance of a surge capacity for a 10-year, 24-hour storm event (BPT) or a 25-year, 24-hour storm event (BAT) in the gypsum storage and disposal area.
- If stored wastewater reaches 50 percent of the required surge capacity, the facility is *allowed* to discharge treated wastewater.
- If stored wastewater exceeds 50 percent of the required surge capacity, the facility is *required* to treat and discharge wastewater.
- During discharge events, the facility is required to meet limitations for phosphorus, fluoride (25 milligrams per liter monthly average and 75 milligrams per liter daily maximum), total suspended solids, and pH.

The applicability of Subpart A excludes certain wet-process phosphoric acid processes from BPT, BAT, and BCT limitations that were under construction either on or before April 8, 1974, at plants located in the state of Louisiana. As a result, the Mosaic Fertilizers facility in Uncle Sam (previously owned by IMC Phosphates) and the IMC Phosphates facility in St. James are excluded from Subpart A. Permit writers limit discharges from these facilities using facility-specific permitting support (see 52 FR 28428, July 29, 1987). See the *Technical Support Document for the 2006 Effluent Guidelines Program Plan* (Section 8.5.4) for information on how discharges from these facilities are permitted (U.S. EPA, 2006).

7.4 Fertilizer Manufacturing Category Conclusions

The estimated toxicity of the Fertilizer Manufacturing Category discharges results mainly from the fluoride discharges of two facilities (accounting for 95 percent of the category's 2009 combined TWPE), which are excluded from the Subpart A applicability. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- The two facilities that accounted for 99 percent of the fluoride discharges, Mosaic Fertilizers' Uncle Sam facility and IMC Phosphates' St. James facility, are exempt from 40 CFR Part 418 Subpart A. The permit limits are based on facility-specific permitting support (U.S. EPA, 2011). These facilities do not represent the category as a whole because they are exempt from Part 418 (see 52 FR 28428, July 29, 1987).
- The total 2009 TWPE excluding the fluoride discharges from these two facilities is 16,300. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with “(3)” in the “Findings” column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

7.5 Fertilizer Manufacturing Category References

1. U.S. EPA. 1974. Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Basic Fertilizer Chemicals Segment of the Fertilizer Manufacturing Point Source Category. Washington, D.C. (March). EPA-440-1-75-042-a.

2. U.S. EPA. 2004. *Technical Support Document for the 2004 Effluent Guidelines Program Plan*. Washington, D.C. (August). EPA 821-R-04-014. EPA-HQ-OW-2003-0074-1346 through 1352.

3. U.S. EPA. 2005. *Preliminary 2005 Review of Prioritized Categories of Industrial Dischargers*. Washington, D.C. (August). EPA-821-B-05-004. EPA-HQ-OW-2004-0032-0053.

4. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. Washington, D.C. (December). EPA-821-R-06-018. EPA-HQ-OW-2004-0032-2782.

5. U.S. EPA. 2007. *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-821-R-07-007. EPA-HQ-OW-2006-0771-0819.

6. U.S. EPA. 2008. *Technical Support Document for the 2008 Effluent Guidelines Program Plan*. Washington, D.C. (August). EPA-821-R-08-015. EPA-HQ-OW-2006-0771-1701.

7. U.S. EPA. 2009. *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan*. Washington, DC. (October). EPA-821-R-09-006. EPA-HQ-OW-2008-0517-0515.

8. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA 820-R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

9. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

8. INORGANIC CHEMICALS MANUFACTURING (40 CFR PART 415)

EPA selected the Inorganic Chemicals Manufacturing (Inorganic Chemicals) Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. The Final 2010 Plan (U.S. EPA, 2011) summarizes the results of EPA's 2010 review of this industry. EPA also reviewed discharges from the Inorganic Chemicals Category as part of the 2004 through 2009 Annual Reviews, except for 2008 (U.S. EPA, 2004a, 2005, 2006, 2007, 2009). This section summarizes the results of the 2011 Annual Reviews associated with the Inorganic Chemicals Category. EPA focused on discharges of manganese and manganese compounds and dioxin and dioxin-like compounds because of their high TWPE relative to the rest of the Inorganic Chemicals Category.

EPA has reviewed discharges from the Chlor-Alkali Subcategory as part of the Chlorine and Chlorinated Hydrocarbons effluent guidelines rulemaking. Because a rulemaking for this segment of the Inorganic Chemicals Category began in 2005, and given EPA's findings on the industry, EPA excluded discharges from these facilities from a further toxicity ranking analysis in this year's review (see Table V-1, 76 FR 66286, October 26, 2011).

8.1 Inorganic Chemicals Category Toxicity Rankings Analysis

Table 8-1 compares the toxicity rankings analysis results for the Inorganic Chemicals Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases increased from discharge years 2002 to 2004, and decreased from discharge year 2007 to 2009.

Table 8-1. Inorganic Chemicals Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Inorganic Chemicals Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	186,000	107,000	293,000
2004	2007	123,000	316,000	439,000
2005	2008	92,100	NA	NA
2007	2009	54,700	394,000	449,000
2008	2010	71,300	228,000	299,000
2009	2011	72,500	51,300	124,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

a Discharges include transfers to POTWs and account for POTW removals.

b DMR data from 2002 through 2007 only include major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

8.2 Inorganic Chemicals Category Pollutants of Concern

EPA's review of the Inorganic Chemicals Category focused on the 2009 TRI discharges because the 2009 TRI data account for 58 percent of the category's combined TWPE. Table 8-2 lists the five pollutants with the highest TRI TWPE based on results from the 2011 and 2010 Annual Reviews (*TRIReleases2009_v2* and *TRIReleases2008_v3*, respectively).

The top two pollutants in the TRI database, manganese and manganese compounds and dioxin and dioxin-like compounds, account for approximately 68 percent of the category's 2009 TRI TWPE. These two pollutants have consistently accounted for the majority of the Inorganic Chemicals Category TWPE:

- Manganese and manganese compounds have been the top TRI-reported pollutant in the 2004, 2008, and 2009 rankings databases (U.S. EPA, 2011).
- Dioxin and dioxin-like compounds are the second top TRI-reported pollutant in the 2009 rankings database and were also the top TRI-reported pollutant in 2002 (U.S. EPA, 2006).

EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because the other pollutants represent less than 32 percent of the category's 2009 TRI TWPE.

Table 8-2. Inorganic Chemicals Category Top TRI Pollutants

Pollutant	2008 TRI Data[a]			2009 TRI Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Manganese and manganese compounds	1	26	38,200	1	24	35,800
Dioxin and dioxin-like compounds	Pollutants not reported in the top five 2008 TRI-reported pollutants.			2	7	13,800
Arsenic and arsenic compounds	3	5	6,100	3	6	6,140
Nitrate compounds	4	49	5,340	4	49	3,910
Mercury and mercury compounds	2	10	6,680	5	11	3,510
Polychlorinated biphenyls (PCBs)	5	2	3,570	Pollutants not reported in the top five 2009 TRI-reported pollutants.		
Inorganic Chemicals Category Total	**NA**	**161[b]**	**71,300**	**NA**	**153[b]**	**72,500**

Sources: TRIReleases2007_v2 and TRIReleases2008_v3.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] Number of facilities reporting TWPE greater than zero.

NA: Not applicable.

8.3 Inorganic Chemicals Category Manganese and Manganese Compound Discharges in TRI

Table 8-3 presents the facilities that account for the manganese and manganese compound discharges in the 2009 TRI database. Two plants are responsible for 65 percent of these discharges: Tronox Pigments, Inc. (Tronox Pigments), and Tronox LLC.

Tronox Pigments and Tronox LLC both manufacture titanium dioxide (Blackmon, 2011; Freeze, 2011). Previous annual reviews have identified titanium dioxide manufacturers as facilities with high manganese and manganese compound discharges. EPA focused its additional review for the 2011 Annual Reviews on discharges from Tronox Pigments and Tronox LLC.

Table 8-3. Manganese and Manganese Compound Discharging Facilities in the Inorganic Chemicals Category in the 2009 TRI Database

Facility Name	Facility Location	Pollutant TWPE	Facility Percent of Manganese and Manganese Compounds Category TWPE
Tronox Pigments, Inc.	Savannah, GA	11,700	33%
Tronox LLC	Hamilton, MS	11,600	32%
Millennium Inorganic Chemicals Inc. Hawkins Point Plant	Baltimore, MD	6,880	19%
DuPont Edgemoor	Edgemoor, DE	2,440	7%
Remaining facilities reporting manganese and manganese compound discharges[a]	NA	3,220	9%
Total	**NA**	**35,800**	**100%**

Source: TRIReleases2009_v2.

[a] There are 20 remaining facilities that have manganese and manganese compound discharges in the 2009 TRI database, which account for 9 percent of the category's manganese and manganese compound TRI TWPE.

NA: Not applicable.

8.3.1 Tronox Pigments, Inc.

Tronox Pigments in Savannah, GA, is the top manganese and manganese compound discharging facility. As part of the 2011 Annual Reviews, EPA contacted the facility and confirmed the manganese discharges were not reporting errors. However, Tronox representatives stated that manganese discharges resulted from their titanium dioxide manufacturing, which was shutdown in August 2009 (Blackmon, 2011). The facility continues to operate its sulfuric acid plant (Blackmon, 2011; Tronox, 2007). As shown in Table 8-4, Tronox Pigments' manganese and manganese compound TWPE decreased from 2007 to 2009. Tronox Pigments did not report manganese and manganese compound discharges in 2010, confirming that the manganese-generating operation has been shutdown.

Tronox Pigments also filed bankruptcy in 2009. The facility is in litigation with Anadarko Petroleum Corporation, causing many of its operations to be shutdown. Given the shutdown of the operation that generates manganese and ongoing litigation, the facility's operations and discharges are not likely representative of other facilities in the category (U.S. EPA, 2010).

Table 8-4. Manganese and Manganese Compound Discharges for Tronox Pigments, Inc.

Year of Discharge	Manganese and Manganese Compound Discharge (lbs)	Manganese and Manganese Compounds TWPE
2005	466,000	32,800
2006	257,000	18,100
2007	282,000	19,900
2008	230,000	16,100
2009	167,000	11,700
2010	NR	NR

Sources: TRIReleases2005_v2; TRIReleases2006_v1; TRIReleases2008_v2; TRIReleases2009_v2; and Envirofacts.
NR – Not reported.

8.3.2 Tronox LLC

Tronox LLC in Hamilton, MS, is the second top manganese and manganese compound discharging facility in the 2009 TRI database, with 165,000 pounds discharged. EPA contacted the facility as part of the 2011 Annual Reviews and confirmed that the toxicity rankings databases accurately quantify the manganese discharges. Tronox LLC stated that the manganese discharges were higher than usual in 2009 due to unusually high stormwater runoff entering their settling ponds, which Tronox LLC considered a process upset and not representative of normal operating conditions (Freeze, 2011).

The facility contact also provided manganese discharge data for 2008 through 2010 and confirmed that its titanium dioxide plant generates manganese-containing wastewater (Freeze, 2011). Table 8-5 presents the manganese discharges the facility provided, along with those listed in the TRI database for the same period. The data confirm the site's information that the 2009 discharge is greater than in 2008 and 2010 because of the process upset. EPA concludes that the increased manganese and manganese compound discharges for 2009 were a result of a process upset and are not likely representative of other facilities in the category.

Table 8-5. Manganese and Manganese Compound Discharges for Tronox LLC

Year of Discharge	Facility Provided Manganese and Manganese Compound Discharge (lb)[a]	Manganese and Manganese Compound Discharges in TRI Database	
		Discharge (lb)	TWPE
2008	90,400	89,400	6,300
2009	165,000	165,000	11,600
2010	124,000	124,000	8,730

Source: Facility contact (Freeze, 2011).
[a] Discharges are from outfalls 101 and 201. Outfall 101 carries cooling water and stormwater runoff; outfall 201 carries process water, sanitary water, and stormwater runoff from process areas.

8.4 Inorganic Chemicals Category Dioxin and Dioxin-Like Compound Discharges in TRI

The second top pollutant in the 2009 TRI database is dioxin and dioxin-like compounds. Table 8-6 presents the facilities that account for the dioxin and dioxin-like compound discharges in the 2009 TRI database. Eighty-six percent of these discharges are from one facility, DuPont Edgemoor.

Table 8-6. Dioxin and Dioxin-Like Compound Discharging Facilities in the 2009 TRI Database

Facility Name	Facility Location	Pollutant TWPE	Facility Percent of Dioxin and Dioxin-Like Compounds Category TWPE
DuPont Edgemoor	Edgemoor, DE	11,800	86%
Remaining facilities reporting dioxin and dioxin-like compound discharges[a]	NA	1,970	14%
Total	**NA**	**13,800**	**100%**

Source: TRIReleases2009_v2.

a There are six remaining facilities that have dioxin and dioxin-like compound discharges in the 2009 TRI database, which account for 14 percent of the category's dioxin and dioxin-like compounds TRI TWPE.

NA: Not applicable.

Dioxin and dioxin-like compounds form during the chloride-ilmenite titanium dioxide manufacturing process (U.S. EPA, 2006). The DuPont Edgemoor facility manufactures titanium dioxide using the chloride-ilmenite process and indicated that discharges of dioxin and dioxin-like compounds had decreased since the facility installed a "PBT Unit" in 2001 to remove additional solids. Table 8-7 presents the dioxin and dioxin-like compound discharges for DuPont Edgemoor for discharge years 2002 to 2009.

Table 8-7. Dioxin and Dioxin-Like Compound Discharges for DuPont Edgemoor

Year of Discharge	Dioxin and Dixon-Like Compound Discharge (grams)	Dioxin and Dioxin-Like Compounds TWF[a]	Dioxin and Dixon-Like Compounds TWPE
2002	13.6	2,021	60.5
2003	0.708	132,994	208
2004	0.283	250,244	156
2005	0.135	132,994	40
2006	0.48	288,398	305
2007	4.89	207,568	2,240
2008	0.57	37,219	46.8
2009	2.82	1,904,247	11,800

Sources: TRIReleases2002_v4; TRIReleases2003_v2; TRIReleases2004_v3; TRIReleases2005_v02; TRIReleases2007_v2; TRIReleases2008_v3; and TRIReleases2009_v2.

a The dioxin and dioxin-like compounds class includes 17 individual congeners, each with its own toxic weighting factor (TWF). Facilities can report the mass of each congener in a separate field (referred to as the dioxin distribution). EPA uses the dioxin distribution to calculate a facility-specific TWF and TWPE. Because the dioxin TWF is based on the congeners reported yearly by the facility, it is possible to have similar amounts of dioxin and drastically different TWFs due to differences in the congener distribution.

EPA investigated whether the 2009 dioxin release estimate was based on measurements of dioxin that are below detection limits. Often, to follow TRI guidance, facilities estimate their releases using half the detection limit of a congener that was never detected. For EPA's toxicity rankings analysis purposes, this can lead to an overestimation of TWPE.

EPA has monitored dioxin and dioxin-like compound discharges from DuPont Edgemoor since 2006. EPA contacted the facility as part of the 2006 Annual Reviews to determine the accuracy of the reported dioxin and dioxin-like compound discharges in the 2003 TRI (Wood, 2006); the facility had indeed used half the detection limit to estimate the load for TRI reporting (U.S. EPA, 2006). Section 9.5 of the *Technical Support Document for the 2006 Effluent Guidelines Program Plan* (U.S. EPA, 2006) presents EPA's findings from the 2006 Annual Reviews.

To determine if the facility's reported 2009 dioxin load was based on non-detect values, EPA compared the results to DuPont Edgemoor's 2003 results. Table 8-8 presents DuPont Edgemoor's 2003 sampling results, extrapolated 2009 sampling results, and the EPA Method 1613B minimum level (U.S. EPA, 2004b). EPA used the facility's reported 2009 congener distribution and the permit limit flow to extrapolate 2009 concentrations, also presented in Table 8-8. DuPont Edgemoor estimated its facility load based on monitoring data, as reported to the 2009 TRI; therefore, the estimated concentrations in Table 8-8 represent valid estimates of DuPont's measurements.

As shown in Table 8-8, DuPont Edgemoor only detected one of the congeners above the EPA Method 1613B minimum level in 2003: 1,2,3,4,6,7,8,9-OCDF. Based on the estimated 2009 concentrations, only two of the calculated 2009 concentrations are above the EPA Method 1613B minimum level: 1,2,3,4,6,7,8-HpCDF and 1,2,3,4,6,7,8,9-OCDD. Both of these congeners are considered less toxic than most dioxin and dioxin-like congeners and are assigned low TWF values. Table 8-8 shows that the amount of dioxin and dioxin-like concentrations used for the 2009 TRI estimate are likely similar to the 2003 sampling results. That is, most likely only one or two congeners were detected. When recalculated using only those congeners likely detected, the load discharged decreases from 2.82 grams to 1.92 grams and the associated TWPE decreases from 11,800 to 193. As with the 2003 discharges, the facility's discharges of dioxin and dioxin-like compounds are likely below the EPA Method 1613B minimum level.

Further, DuPont Edgemoor's NPDES permit regulates the discharge of dioxins and furans by both quantity and concentration permit limits for dioxin and dioxin-like compounds: 2.2×10^{-10} pounds per day toxic equivalency (TEQ)[6] and 5.1×10^{-9} micrograms per liter TEQ (DNREC, 2007a). The dioxin and dioxin-like compound permit limits are based on Delaware's Surface Water Quality Standards (DNREC, 2007b). The permit further requires that DuPont Edgemoor prepare a pollutant minimization plan for dioxin and dioxin-like compounds that will locate pollutant sources and review process modifications, materials substitutions, treatment technologies, best management practices, and/or facility procedures to identify options to reduce discharges (DNREC, 2007a).

As in previous years, EPA concludes that additional study and analysis of dioxin and dioxin-like discharges from DuPont Edgemoor is not necessary. DuPont Edgemoor has not detected most congeners of dioxin and dioxin-like compounds, and the facility has likely never

[6] TEQs are calculated values that allow for a comparison of the toxicity of different combinations of dioxin and dioxin-like compounds using a toxic equivalent factor. This factor is the ratio of the toxicity of one of the compounds to the toxicity of the two most toxic compounds, 2,3,7,8-TCDD and 1,2,3,7,8-PeCDD.

detected concentrations above the EPA Method 1613B minimum level. Further, the facility's NPDES permit requires them to continue to develop better treatment of dioxin and dioxin-like compounds, and the discharge is already controlled. Finally, DuPont Edgemoor is one of the few remaining U.S. facilities that manufactures titanium dioxide. Its dioxin discharges do not represent discharges across the category as a whole.

Table 8-8. 2009 Concentrations of Dioxin and Dioxin-Like Compounds in Effluent Samples (pg/L) From DuPont Edgemoor and EPA Method 1613B Minimum Levels

Congener	TWF	1613B ML (pg/L)	2003[a] (pg/L)	2009[b] (pg/L)
Flow (MGY)[c]				1,898
Polychlorinated dibenzo-p-furans (CDFs)				
2,3,7,8-TCDF	43,819,553.68	10	ND	ND
1,2,3,7,8-PeCDF	7,632,640	50	ND	ND
2,3,4,7,8-PeCDF	557,312,000	50	ND	ND
1,2,3,4,7,8-HxCDF	5,760,000	50	2.675	24.8
1,2,3,6,7,8-HxCDF	14,109,440	50	ND	40
2,3,4,6,7,8-HxCDF	51,204,160	50	ND	0.445
1,2,3,7,8,9-HxCDF	47,308,800	50	ND	ND
1,2,3,4,6,7,8-HpCDF	85,760	50	18.27	132[d]
1,2,3,4,7,8,9-HpCDF	3,033,984	50	ND	0.682
1,2,3,4,6,7,8,9-OCDF	2,020.96	100	101.24[d]	52
Polychlorinated dibenzo-p-dioxins (CDDs)				
2,3,7,8-TCDD	703,584,000	10	ND	ND
1,2,3,7,8-PeCDD	692,928,000	50	ND	ND
1,2,3,4,7,8-HxCDD	23,498,240	50	ND	ND
1,2,3,6,7,8-HxCDD	9,556,480	50	ND	ND
1,2,3,7,8,9-HxCDD	10,595,840	50	ND	0.0835
1,2,3,4,6,7,8-HpCDD	411,136	50	ND	6.32
1,2,3,4,6,7,8,9-OCDD	6,585.6	100	7.335	136[d]

Sources: TRIReleases2009_v2; Technical Support Document for the 2006 Effluent Guidelines Program Plan (U.S. EPA, 2006); facility contact (Wood, 2006); facility permit (DNREC, 2007a); and Method 1613: Tetra- Through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS (U.S. EPA, 2004b).

a Concentrations discharged from outfall 001, effluent from the wastewater treatment system (DNREC, 2007a).

b Concentrations calculated using the facility's reported congener distribution in 2009 and the permit limit flow.

c Facility permit flow for outfall 001.

d Concentrations greater than Method 1613B ML.

ML: Minimum level established for EPA Method 1613B (U.S. EPA, 2004b).

ND: No data.

8.5 Inorganic Chemicals Category Conclusions

The estimated toxicity of the Inorganic Chemicals Category discharges resulted from manganese and manganese compounds and dioxin and dioxin-like compounds. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- Two facilities, Tronox Pigments, Inc. (Savannah, GA) and Tronox LLC (Hamilton, MS), account for 65 percent of the category's 2009 TRI discharges of manganese and manganese compounds. Both facilities are titanium dioxide manufacturers and confirmed that the 2011 toxicity rankings databases accurately estimate their manganese and manganese compound discharges (Blackmon, 2011; Freeze, 2011). However, for both facilities, the 2009 discharge is not representative of typical discharges from titanium dioxide manufacturing:

  — Tronox Pigments shut down its titanium dioxide process in August 2009; the facility expects this will result in a reduction in manganese and manganese compound discharges.

  — Tronox LLC's high 2009 manganese discharges resulted from process upsets.

  These facilities' discharges are not likely representative of other facilities in the category. For this reason, EPA is not identifying these discharges as a priority hazard at this time.

- DuPont Edgemoor accounts for 86 percent of the category's 2009 TRI discharges of dioxin and dioxin-like compounds. The facility manufactures titanium dioxide using the chloride-ilmenite process, which produces dioxin and dioxin-like compounds. Using the facility's reported 2009 congener distribution and the permit limit flow, EPA determined only two of the congeners were above the EPA Method 1613B minimum level: 1,2,3,4,6,7,8-HpCDF and 1,2,3,4,6,7,8,9-OCDD. These two congeners have low toxicity compared to other congeners, and therefore are assigned low TWFs. DuPont Edgemoor has not detected most congeners of dioxin and dioxin-like compounds, and the facility has likely never detected concentrations above the EPA Method 1613B minimum level. DuPont Edgemoor's permit also includes dioxin and dioxin-like compound limits and requirements to develop a pollutant minimization plan, controlling the discharge. As found in previous years, additional study and analysis of dioxin discharges in the Inorganic Chemicals Category is not warranted at this time.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

8.6 Inorganic Chemicals Category References

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9. IRON AND STEEL MANUFACTURING (40 CFR PART 420)

EPA selected the Iron and Steel Manufacturing Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. This section summarizes the results of the 2011 Annual Reviews, which focused on discharges of cyanide, chlorine, chromium, fluoride, and aluminum due to their high TWPE relative to the other pollutants in the Iron and Steel Manufacturing Category.

9.1 Iron and Steel Manufacturing Category Background

This subsection provides the background on the Iron and Steel Manufacturing Category, including a brief profile of the iron and steel manufacturing industry and background on 40 CFR Part 420.

9.1.1 Iron and Steel Manufacturing Industry Profile

The iron and steel manufacturing industry includes facilities whose production operations discharge and introduce pollutants into surface water as well as publicly owned treatment works (POTWs).

EPA considered the following seven industrial categories as part of the Iron and Steel Manufacturing Category, encompassing seven North American Industry Classification System (NAICS) codes and four Standard Industrial Classification (SIC) codes:

- NAICS 331111: Iron and Steel Mills (including Cokemaking Facilities)
- NAICS 331210: Iron and Steel Pipe and Tube Manufacturing
- NAICS 331221: Rolled Steel Shape Manufacturing (Blast Furnace, Steel Works, and Rolling Mills)
- NAICS 331222: Steel Wire Drawing and Steel Nails
- The steelmaking facilities within the following NAICS Codes:
  - NAICS 332618: Other Fabricated Wire Product Manufacturing
  - NAICS 332112: Nonferrous Forging (Blast Furnace, Steel Works, and Rolling Mills)
  - NAICS 332813: Electroplating, Plating, Polishing, Anodizing, and Coloring (Cold Rolled Steel)

The PCS and ICIS-NPDES systems report facilities by SIC code and the U.S. Economic Census, and Toxics Release Inventory (TRI) report data by NAICS code. Because of this discrepancy, EPA reclassified the 2009 discharge monitoring report (DMR) data by the equivalent NAICS code. Table 9-1 lists the number of facilities from the U.S. Economic Census and the toxicity rankings databases for the seven industrial categories with operations in the Iron and Steel Manufacturing Category. The U.S. Economic Census includes more facilities than the DMR toxicity rankings database: facilities may not meet TRI-reporting thresholds, facilities may discharge to a POTW, and some facilities in the U.S. Economic Census are distributors or sales facilities, not manufacturers.

Table 9-1. Number of Iron and Steel Manufacturing Facilities

2007 U.S. Economic Census	2009 DMR[a]			2009 TRI[b]			
	Total	Minor	Major	Total	Indirect	Direct	Both
4,949	161	76	85	228	52	125	51

Sources: U.S. Economic Census (2007); *TRIReleases2009_v2;* and *DMRLoads2009_v2*.

[a] Minor facility discharges may or may not adversely impact receiving water if not controlled.
Major facility discharges have the capability to impact receiving waters if not controlled.

[b] Indirect facilities discharge to POTWs.
Direct facilities discharge directly to surface water.

9.1.2 40 CFR Part 420

EPA first promulgated effluent limitations guidelines (ELGs) for the Iron and Steel Manufacturing Category (40 CFR Part 420) in May 1982 (47 FR 23258) and last amended them in April 2002 (67 FR 64215). This category consists of 13 subcategories that apply to the manufacture of products and product groups, as shown in Table 9-2 with corresponding applicability.

Table 9-2. Applicability and Regulated Pollutants for the Iron and Steel Manufacturing Category

Subpart	Subcategory Title	Subcategory Applicability	Regulated Pollutants														
			Ammonia as N	Benzo(a)pyrene	Chromium	Cyanide	Lead	Naphthalene	Nickel	Oil and Grease	pH	Phenols (4AAP)	Tetrachloroethylene	Total Residual Chlorine	Total Suspended Solids	Zinc	2, 3, 7, 8- TCDF
A	Cokemaking	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from byproduct and other cokemaking operations.	X	X		X		X		X	X	X			X		
B	Sintering	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from sintering operations conducted by heating iron-bearing wastes together with fine iron ore, limestone, and coke fines in an ignition furnace to produce an agglomerate for charging to the blast furnace.	X			X	X			X	X	X		X	X	X	X
C	Ironmaking	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from ironmaking operations in which iron ore is reduced to molten iron in a blast furnace.	X			X	X			X	X	X		X	X	X	
D	Steelmaking	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from steelmaking operations conducted in basic oxygen and electric arc furnaces.					X				X				X	X	
E	Vacuum Degassing	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from vacuum degassing operations conducted by applying a vacuum to molten steel.					X				X				X	X	
F	Continuous Casting	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from continuous casting of molten steel into intermediate or semi-finished steel products through water cooled molds.					X			X	X				X	X	

Table 9-2. Applicability and Regulated Pollutants for the Iron and Steel Manufacturing Category

Subpart	Subcategory Title	Subcategory Applicability	Regulated Pollutants														
			Ammonia as N	Benzo(a)pyrene	Chromium	Cyanide	Lead	Naphthalene	Nickel	Oil and Grease	pH	Phenols (4AAP)	Tetrachloroethylene	Total Residual Chlorine	Total Suspended Solids	Zinc	2, 3, 7, 8- TCDF
G	Hot Forming	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from hot forming operations conducted in primary, section, flat, and pipe and tube mills.								X	X				X		
H	Salt Bath Descaling	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from oxidizing and reducing salt bath descaling operations.			X	X			X		X				X		
I	Acid Pickling	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from sulfuric acid, hydrochloric acid, or combination acid pickling operations.			X		X		X	X	X				X	X	
J	Cold Forming	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from cold rolling and cold working pipe and tube operations in which unheated steel is passed through rolls or otherwise processed.			X		X	X	X	X	X		X		X	X	
K	Alkaline Cleaning	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from operations in which steel and steel products are immersed in alkaline cleaning baths to remove mineral and animal fats or oils from the steel, and those rinsing operations which follow immersion.								X	X				X		
L	Hot Coating	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from operations in which steel is coated with zinc, terne metal, or other metals by the hot dip process, and associated rinsing operations.			X		X			X	X				X	X	

Table 9-2. Applicability and Regulated Pollutants for the Iron and Steel Manufacturing Category

Subpart	Subcategory Title	Subcategory Applicability	Regulated Pollutants														
			Ammonia as N	Benzo(a)pyrene	Chromium	Cyanide	Lead	Naphthalene	Nickel	Oil and Grease	pH	Phenols (4AAP)	Tetrachloroethylene	Total Residual Chlorine	Total Suspended Solids	Zinc	2, 3, 7, 8- TCDF
M	Other Operations	Discharges to waters of the U.S. and the introduction of pollutants into a POTW from production of direct-reduced iron and from briquetting and forging operations.								X	X				X		

9.2 Iron and Steel Manufacturing Category 2011 Toxicity Rankings Analysis

Table 9-3 compares the toxicity rankings analysis results for the Iron and Steel Manufacturing Category from the 2009 through 2011 Annual Reviews. The combined DMR and TRI TWPE has decreased from discharge years 2008 to 2009. The estimated 2009 DMR TWPE accounts for approximately 58 percent of the combined 2009 DMR and TRI TWPE.

Table 9-3. Iron and Steel Manufacturing Category TRI and DMR Discharges for the 2009 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Iron and Steel Manufacturing Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2007	2009	104,000	730,000	834,000
2008	2010	111,000	616,000	727,000
2009	2011	96,200	134,000	230,000

Sources: *TRI Releases 2007 v2, DMRLoads2007_v4, TRIReleases2008_v3, DMRLoads2008_v3; TRIReleases2009_v2;* and *DMRLoads2009_v2*.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2007 include only major dischargers. DMR 2008 data include both minor and major dischargers.

9.3 Iron and Steel Manufacturing Category Pollutants of Concern

EPA's review of the Iron and Steel Manufacturing Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 9-4 lists the five pollutants with the highest TWPE based on results from the 2011 Annual Reviews *(DMRLoads2009_v2)*. The top five DMR-reported pollutants in 2009 contribute more than 61 percent of the total category TWPE.

Table 9-4. Iron and Steel Manufacturing Category Top DMR Pollutants

Pollutant	2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE
Cyanide	1	24	27,400
Chlorine	2	29	17,200
Chromium	3	35	16,000
Fluoride	4	10	11,500
Aluminum	5	16	9,660
Iron and Steel Manufacturing Category Total	**NA**	**122[b]**	**134,000**

Source: *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

EPA's additional review for the 2009 DMR database pollutants of concern, cyanide, chlorine, chromium, fluoride, and aluminum, is presented in the following subsections. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they account for a minority (39 percent) of the 2009 Iron and Steel Manufacturing Category DMR TWPE.

9.4 Iron and Steel Manufacturing Category Cyanide Discharges in DMR

Cyanide discharges in the 2009 DMR database account for 21 percent of the total DMR TWPE. Table 9-5 presents the cyanide dischargers in the 2009 DMR database. Discharges of cyanide from two facilities account for over 56 percent of the category's cyanide DMR TWPE. As a result, EPA focused its review of cyanide discharges on the top two facilities.

Table 9-5. Iron and Steel Manufacturing Category Cyanide Dischargers in the 2009 DMR Database

Facility Name	Location	Cyanide Pounds Discharged	Cyanide TWPE	Facility Percent of Cyanide Category TWPE
US Steel Corp.–Clairton Works	Clairton, PA	9,100	10,100	37%
Mountain State Carbon, LLC	Follansbee, WV	4,770	5,290	19%
Remaining facilities reporting cyanide discharges[a]		10,800	12,000	44%
Total		**24,700**	**27,400**	**100%**

Source: DMRLoads2009_v2.

[a] There are 18 remaining facilities that have cyanide discharges in the 2009 DMR database, which account for 44 percent of the category's cyanide DMR TWPE.

Both of the top two facilities are cokemaking plants: plants that produce carbon-coke from coal for steelmaking. Cokemaking operations generate wastewater containing cyanide as part of the byproduct recovery process. Currently, there are 19 cokemaking plants in the United States. Table 9-6 lists U.S. coke plants operating in 2011, their locations, and their range of cyanide concentrations in 2009. As shown, Mountain State Carbon has the highest cyanide concentration range.

Table 9-6. Operating U.S. Coke Plants as of September 1, 2011

State	Facility Name	City	Facility Range of 2009 Cyanide Concentrations (mg/L)
Alabama	ABC Coke (Drummond Company, Inc.)	Tarrant	0.282–4.62
	Walter Coke	Birmingham	0.012–1.01
Illinois	U.S. Steel	Granite City	0.005(ND)–0.03
	Gateway Energy & Coke Company	Granite City	NR
Indiana	Indiana Harbor Coke Company	East Chicago	0.003(ND)–0.024
	ArcelorMittal	Burns Harbor	0.002(ND)–0.004
	U.S. Steel	Gary	NR
Michigan	DTE Energy Services	Ecorse	NR
New York	Tonawanda Coke Corp.	Tonawanda	NR
Ohio	AK Steel Corp.	Middletown	NR
	Middletown Coke Co.	Middletown	NR
	ArcelorMittal	Warren	NR
	SunCoke Co.	Haverhill	NR

Table 9-6. Operating U.S. Coke Plants as of September 1, 2011

State	Facility Name	City	Facility Range of 2009 Cyanide Concentrations (mg/L)
Pennsylvania	Erie Coke Corp.	Erie	NR
	ArcelorMittal	Monessen	NR
	DTE Energy Services	Pittsburgh	1–2
	U.S. Steel	Clairton	0.789–2.64
Virginia	Jewell Coke and Coal	Vansant	NR
West Virginia	Mountain State Carbon	Follansbee	0.62-6.2

Sources: ACCCI (2011), DMR Loadings Tool.
NR: Not reported.

9.4.1 U.S. Steel Corporation–Clairton Works

U.S. Steel Corporation–Clairton Works (U.S. Steel) in Clairton, PA, discharges cyanide from its outfall 183 in wastewater from cokemaking. Table 9-7 presents U.S. Steel's 2009 monthly cyanide and flow discharge data in the DMR Loadings Tool for outfall 183. The outfall's cyanide limits as stated in the facility permit are 5.5 milligrams per liter (mg/L) or 53.5 kilograms per day (kg/day) (PADEP, 2006). As shown in Table 9-7, the facility's discharge data do not exceed permit limits and are below treatable levels.[7] Their relatively high cyanide TWPE results from their large flow, as they historically have been the top coke producer in the U.S. (U.S. EPA, 2002).

Table 9-7. U.S. Steel's Outfall 183 2009 Monthly Cyanide and Flow Discharge Data

Monitoring Period Date	DMR Loadings Tool Average Cyanide Discharge (kg/day)	DMR Loadings Tool Average Flow (MGD)	DMR Loadings Tool Average Cyanide Concentrations (mg/L)
31-Jan-09	13.85	2.53	1.457
28-Feb-09	13.68	2.56	1.406
31-Mar-09	12.09	2.49	1.288
30-Apr-09	10.58	2.17	1.255
31-May-09	6.48	2	0.855
30-Jun-09	6.32	2.04	0.789
31-Jul-09	8.89	2.21	1.079
31-Aug-09	9.39	2.16	1.167
30-Sep-09	7.41	2.25	0.871
31-Oct-09	11.24	2.16	1.35
30-Nov-09	11.78	2.37	1.46
31-Dec-09	23.95	2.38	2.643

Source: DMR Loadings Tool.

[7] For the most recent 2002 effluent guideline revision, EPA established production-based limits based on long-term average (LTA) for best available technology economically achievable (BAT) for cyanide at 2.965 mg/L, and a variability factor of 1.49. The Clairton cyanide concentrations are less than this estimated treatability concentration.

9.4.2 Mountain State Carbon, LLC

Mountain State Carbon, LLC, in Follansbee, WV, discharges cyanide from its outfall 205. Mountain State Carbon discharges treated process wastewater, ground water, and stormwater from the biological treatment plant through this outfall. Table 9-8 presents Mountain State Carbon's 2009 monthly cyanide and flow discharge data in the DMR Loadings Tool for outfall 205. A missing decimal point in the May 2009 concentration was identified and corrected. The facility's permit states that the cyanide limit for outfall 205 is 11.1 kg/day (WVDEP, 2008). As shown in Table 9-8, the November 2009 quantity exceeds the mass-based facility permit limit.

Table 9-8. Mountain State Carbon's Outfall 205 2009 Monthly Cyanide and Flow Discharge Data

Monitoring Period Date	DMR Loadings Tool Average Cyanide Discharge (kg/day)	DMR Loadings Tool Average Flow (MGD)	DMR Loadings Tool Average Cyanide Concentrations (mg/L)
31-Jan-09	7.07	0.736	2.5
28-Feb-09	6.26	0.713	2.3
31-Mar-09	5.53	0.743	1.9
30-Apr-09	6.08	0.693	2.4
31-May-09	5.44	0.683	2.2
30-Jun-09	5.26	0.0667	2.1
31-Jul-09	4.35	0.696	1.7
31-Aug-09	3.13	0.664	1.2
30-Sep-09	1.91	0.662	0.76
31-Oct-09	1.65	0.69	0.62
30-Nov-09	18.41	0.761	6.2
31-Dec-09	6.30	0.801	2.3

Source: DMR Loadings Tool.

For the most recent 2002 effluent guideline revision, EPA established production-based limits based on long-term average (LTA) for best available technology economically achievable (BAT) for cyanide at 2.965 mg/L. As shown in Table 9-8, Mountain State Carbon's cyanide discharges exceed the treatable level of cyanide for one month. EPA concludes that this one outlier month resulted in a significant amount of TWPE.

EPA further reviewed discharge data for this facility to see how often they exceeded their permit limits and found that the facility was not in compliance during eleven months in 2010. However, the compliance issues appear to be resolved in 2011. Therefore, EPA will continue to review this facility's cyanide discharges in future years of review, but these discharges are not representative of typical cokemaking facility discharges.

9.5 Iron and Steel Manufacturing Category Chlorine Discharges in DMR

Chlorine discharges in the 2009 DMR database account for 13 percent of the total DMR TWPE. Table 9-9 presents the chlorine dischargers in the 2009 DMR database. Discharges of chlorine from one facility account for over 51 percent of the category's chlorine DMR TWPE. EPA focused its review of chlorine discharges on this top facility.

Table 9-9. Iron and Steel Manufacturing Category Chlorine Dischargers in the 2009 DMR Database

Facility Name	Location	Chlorine Pounds Discharged	Chlorine TWPE	Facility Percent of Chlorine Category TWPE
ISG Sparrows Point, Inc.	Sparrows Point, MD	17,400	8,690	51%
Remaining facilities reporting chlorine discharges[a]		17,000	8,500	49%
Total		**34,400**	**17,200**	**100%**

Source: DMRLoads2009_v2.

[a] There are 28 remaining facilities that have chlorine discharges in the 2009 DMR database, which account for 49 percent of the category's chlorine DMR TWPE.

9.5.1 ISG Sparrows Point, Inc.

ISG Sparrows Point, Inc., in Sparrows Point, MD, discharges chlorine from its outfall 001. ISG Sparrows Point discharges primarily noncontact cooling water used for condenser cooling at Pennwood Power Station through this outfall. Table 9-10 presents ISG Sparrows Point's 2009 monthly chlorine and flow discharge data in the DMR Loadings Tool for outfall 001. As shown in Table 9-10 all of the facility's 2009 chlorine discharges are below the permit limit of 0.2 mg/L.

Table 9-10. ISG Sparrows Point's Outfall 001 2009 Monthly Chlorine Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool Chlorine Concentration (mg/L)	Facility Permit-Enforceable Compliance Level Limit—Daily Maximum (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Jan-09	0.1	0.2	7
28-Feb-09	0	0.2	78
31-Mar-09	0	0.2	188
30-Apr-09	0.04	0.2	145
31-May-09	0	0.2	143
30-Jun-09	0	0.2	159
31-Jul-09	0	0.2	204
31-Aug-09	0.1	0.2	223
30-Sep-09	0.1	0.2	176
31-Oct-09	0	0.2	171
30-Nov-09	0.09	0.2	158
31-Dec-09	0	0.2	204

Sources: DMR Loadings Tool and facility permit (MDE, 2001).

As part of the 2011 Annual Reviews, EPA contacted the facility about its 2009 chlorine concentrations and flows from outfall 001. The facility contact confirmed that all 2009 chlorine concentrations were below the permit limit and that the facility had never had a permitting issue with chlorine. The facility contact also stated that the flows are large for outfall 001 because it carries water from the non-contact cooling system for power generation for the onsite power plant (Becker, 2011).

EPA identified an error in how *DMRLoads_v02* estimated the facility's discharges. The DMR database automatically calculates the load based on 24 hours a day of discharge. Because the flow from outfall 001 is non-contact cooling water from a power station, the facility is only allowed to discharge chlorine two hours per day. Therefore, the DMR database overestimated the chlorine load for this facility. With two hours of discharge per day instead of 24, ISG Sparrow's Chlorine TWPE decreases from 8,690 to 1,320.

9.6 Iron and Steel Manufacturing Category Chromium Discharges in DMR

Chromium discharges in the 2009 DMR database account for 12 percent of the total DMR TWPE. Table 9-11 presents the chromium dischargers in the 2009 DMR database. Discharges of chromium from one facility account for over 98 percent of the category's chromium DMR TWPE. Accordingly, EPA focused its review of chromium discharges on that facility.

Table 9-11. Iron and Steel Manufacturing Category Chromium Dischargers in the 2009 DMR Database

Facility Name	Location	Chromium Pounds Discharged	Chromium TWPE	Facility Percent of Chromium Category TWPE
Arcelormittal Weirton Inc.	Weirton, WV	223,000	15,600	98%
Remaining facilities reporting chromium discharges[a]		4,520	316	2%
Total		**228,000**	**16,000**	**100%**

Source: DMRLoads2009_v2.

[a] There are 34 remaining facilities that have chromium discharges in the 2009 DMR database, which account for 2 percent of the category's chromium DMR TWPE.

9.6.1 Arcelormittal Weirton Inc.

Arcelormittal Weirton Inc. in Weirton, WV, discharges chromium from three outfalls: 003, 004, and 203. Outfall 203 is an internal outfall to outfall 003, through which Arcelormittal Weirton discharges cooling water, stormwater runoff and process water. Table 9-12 presents chromium discharge data for outfalls 003, 004, and 203 for 2009. As part of the 2011 Annual Reviews, EPA contacted the facility to confirm these discharges; the facility contact confirmed the discharges as listed in the table (Minda, 2011). The facility's permit does not set limits for chromium outfall 203, though it does require monitoring. For outfall 003, the permit limits daily maximum discharge to 2.05 mg/L and monthly average discharge to 0.81 mg/L. Outfall 003 does not exceed these limits.

The facility contact also confirmed that outfall 203 is an internal outfall to outfall 003, with water from the former undergoing additional treatment for chromium to meet the latter's discharge limits (Minda, 2011). Therefore, discharges from outfall 203 should be removed from the database as double-counts, since they are also part of the discharges from outfall 003. With this correction, Arcelormittal Weirton's TWPE includes discharges from outfall 003 and 004 and decreases to 147.

Table 9-12. Arcelormittal Weirton's 2009 Chromium Discharge and Flow Data

Outfall	DMR Loadings Tool Average Chromium Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)	Total Outfall Chromium Pounds Discharged	Total Outfall Chromium TWPE
003	0.143	8.07	2,080	145
004	0.00375	2.98	24.4	1.70
203	107	1.03	221,000 [a]	15,500

Source: DMR Loadings Tool.

[a] Outfall 203 is an internal outfall. Outfall 203 undergoes additional treatment for chromium prior to discharging to Outfall 003 due to permit limitations (Minda, 2011).

9.7 Iron and Steel Manufacturing Category Fluoride Discharges in DMR

Fluoride discharges in the 2009 DMR database account for 9 percent of the total DMR TWPE. Table 9-13 presents the fluoride dischargers in the 2009 DMR database. Discharges of fluoride from one facility account for 51 percent of the category's fluoride DMR TWPE. Accordingly, EPA focused its review of fluoride discharges on this top facility.

Table 9-13. Iron and Steel Manufacturing Category Fluoride Dischargers in the 2009 DMR Database

Facility Name	Location	Fluoride Pounds Discharged	Fluoride TWPE	Facility Percent of Fluoride Category TWPE
Arcelormittal Weirton Inc.	Weirton, WV	194,000	5,810	51%
Remaining facilities reporting fluoride discharges[a]		189,000	5,660	49%
Total		**382,000**	**11,500**	**100%**

Source: DMRLoads2009_v2.

[a] There are nine remaining facilities that have fluoride discharges in the 2009 DMR database, which account for 49 percent of the category's fluoride DMR TWPE.

9.7.1 Arcelormittal Weirton Inc.

Arcelormittal Weirton Inc. in Weirton, WV, discharges fluoride from its outfall 003. Arcelormittal Weirton discharges cooling water, storm water runoff, and process water through outfall 003. The facility's permit requires monitoring of fluoride discharges from outfall 003 but does not set fluoride limits (Minda, 2011). The Iron and Steel Manufacturing Category ELG does not regulate fluoride.

Table 9-14 presents the facility's fluoride discharge data for 2009. The concentrations ranged from 5.6 mg/L to 14.8 mg/L. EPA determined that current technologies are achieving effluent fluoride concentrations between 2 mg/L and 15 mg/L (WC&E, 2006; Ionics, n.d.; GCIP, 2002).

Table 9-14. Arcelormittal Weirton's Outfall 003 2009 Monthly Fluoride Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool Fluoride Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Mar-09	10.3	6.62
30-Jun-09	13.1	10.2
30-Sep-09	14.8	10.3
31-Dec-09	5.6	5.8

Source: DMR Loadings Tool.

9.8 Iron and Steel Manufacturing Category Aluminum Discharges in DMR

Aluminum discharges in the 2009 DMR database account for 7 percent of the total DMR TWPE. Table 9-15 presents the aluminum dischargers in the 2009 DMR database. Discharges of aluminum from three facilities account for over 64 percent of the category's aluminum DMR TWPE. Accordingly, EPA focused its review of aluminum discharges on these facilities. All three discharge stormwater; for two of them, EPA determined that the stormwater contacts either process areas, scrap storage, or finished product.

Table 9-15. Iron and Steel Manufacturing Category Aluminum Dischargers in the 2009 DMR Database

Facility Name	Location	Aluminum Pounds Discharged	Aluminum TWPE	Facility Percent of Aluminum Category TWPE
Ipsco Tubulars (KY) Inc. Wilder	Campbell County, KY	44,600	2,680	28%
Nucor Steel Tuscaloosa Inc.	Tuscaloosa, AL	32,600	1,960	20%
Nucor Steel Decatur, LLC	Decatur, AL	26,300	1,580	16%
Remaining facilities reporting aluminum discharges[a]		57,400	3,440	36%
Total		**161,000**	**9,660**	**100%**

Source: DMRLoads2009_v2.

[a] There are 13 remaining facilities that have aluminum discharges in the 2009 DMR database, which account for 36 percent of the category's aluminum DMR TWPE.

9.8.1 Ipsco Tubulars (KY) Inc. Wilder

Ipsco Tubulars Inc. in Campbell County, KY, discharges aluminum from its outfall 003, which carries untreated stormwater runoff. Table 9-16 presents Ipsco Tubulars' 2009 monthly aluminum and flow discharge data in the DMR Loadings Tool for outfall 003. As shown in the table, the concentration for February 2009 is two orders of magnitude larger than the concentrations for other months.

Table 9-16. Ipsco Tubulars's Outfall 003 2009 Monthly Aluminum Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool Aluminum Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Jan-09	5.51	0.73
28-Feb-09	182	0.73
31-Mar-09	8.25	0.34
30-Apr-09	3.84	0.34
31-May-09	13.5	0.34
30-Jun-09	5.87	0.34
31-Jul-09	2.36	0.34
31-Aug-09	1.45	0.34
30-Sep-09	5.78	0.34
31-Oct-09	1.4	0.73
30-Nov-09	2.32	0.34
31-Dec-09	3.04	0.34

Source: DMR Loadings Tool.

As part of the 2011 Annual Reviews, EPA contacted the facility about its 2009 aluminum concentrations and flows from outfall 003. The facility contact (McDaniel, 2011) confirmed that the data were correct, and also stated that an incident affected outfall 003 during February 2009, causing high concentrations of oil and grease. The incident affected all parameters in the samples taken on February 11, 2009, but by re-sampling on February 27, 2009, the oil and grease value (along with the rest of the parameters) was within permit limits. This month was an anomaly in the data for this outfall; the facility has experienced nothing similar since February 2009. The incident's cause was never identified.

As shown in Table 9-16, in 2009 the facility's mean effluent aluminum concentration was 19.6 mg/L for outfall 003 (untreated stormwater). In the 2002 rulemaking, EPA established production-based limitations for aluminum for steelmaking, based on two-stage metals precipitation as BAT, which achieved an LTA of 0.229 mg/L for aluminum. The facility's mean discharge concentration, 19.6 mg/L, is higher than this treatable level. Even excluding the February 2009 outlier in Table 9-16, the resulting mean concentration, 4.85 mg/L, is still higher than this treatable level. For these reasons, EPA is considering facility-specific permitting and compliance support to address this facility's untreated stormwater discharge.

9.8.2 Nucor Steel Tuscaloosa Inc.

Nucor Steel in Tuscaaloosa, AL, discharges aluminum from its outfall 001. Outfall 001 discharges "non-contact cooling water from melting, casting, rolling, and electrical substation operations and storm water associated with employee parking areas, semi-finished and finished product storage, and steel mill operations" (ADEM, 2007a). Table 9-17 presents Nucor Steel Tuscaloosa's 2009 aluminum and flow discharge data in the DMR Loadings Tool for outfall 001.

Table 9-17. Nucor Steel's Outfall 001 Tuscaloosa 2009 Aluminum Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool Aluminum Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Mar-09	24	0.67
30-Jun-09	16	0.42
30-Sep-09	13	0.9
31-Dec-09	15	0.95

Source: DMR Loadings Tool.

As part of the 2011 Annual Reviews, EPA contacted the facility about its 2009 aluminum concentrations and flows from outfall 001. The facility contact confirmed the concentrations and flows shown in Table 9-17. The facility contact also stated that outfall 001 has a higher flow than other outfalls because it is the facility's primary NPDES outfall. Outfall 001 handles all of the non-contact cooling water and stormwater for the facility and previously discharged directly to a stream. Following the most recent permit change, the water from outfall 001 now discharges to a primary settling pond and then to a main tributary that leads to the river (Smith and Larmore, 2011).

In the 2002 rulemaking, EPA identified that BAT for the steelmaking subcategory, two-stage metals precipitation, could consistently achieve an LTA of 0.229 mg/L for aluminum, with a variability factor of 0.053. The 2009 aluminum concentrations from outfall 001 are higher than treatable levels (i.e., the waste stream could be treated and aluminum could be discharged at a much lower concentration). EPA is considering facility-specific permitting support to address aluminum discharges from the Nucor Steel Tuscaloosa facility. Also, the discharges for outfall 001 result in part from stormwater and non-contact cooling water, which are not regulated by Part 420 but rather Part 122.

9.8.3 Nucor Steel Decatur LLC

Nucor Steel in Decatur, AL, discharges chromium from outfall 002. Outfall 002 discharges "storm water runoff from the Scrap Yard, North and South Scrap Bays, and Slag Yards associated with the manufacture of hot rolled steel" (ADEM, 2007b). Table 9-18 presents Nucor Steel, Decatur's 2009 aluminum and flow discharge data in the DMR Loadings Tool for outfall 002.

Table 9-18. Nucor Steel Decatur's Outfall 002 2009 Monthly Aluminum Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool Aluminum Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
30-Jun-09	2.92	4.03
31-Dec-09	2.37	1.05

Source: DMR Loadings Tool.

As part of the 2011 Annual Reviews, EPA contacted the facility about its 2009 aluminum concentrations and flows from outfall 002. The facility contact confirmed these concentrations and flows, shown in Table 9-18. The facility contact also stated that outfall 002 discharges to one of the ponds where stormwater from the east part of the plant along with some non-contact cooling water blowdown is collected. There is no treatment except for a pH adjustment once the water is discharged into the collection pond. The facility contact stated that the flows are high for outfall 002 because it is the primary stormwater outfall for the facility (Denton, 2011).

As shown in Table 9-18, in 2009 the facility's mean effluent aluminum concentration was 2.64 mg/L for outfall 002 (untreated stormwater). In the 2002 rulemaking, EPA promulgated production-based limitations for aluminum for wastewater from steelmaking. These limits were based on two-stage metals precipitation as BAT, which achieved an LTA of 0.229 mg/L for aluminum, with a variability factor of 0.053. The facility's discharge concentration is higher than this treatable level. EPA is considering facility-specific permitting support to address aluminum discharges from the Nucor Steel Decatur facility.

9.9 Iron and Steel Manufacturing Category Conclusions

Based on available data, the estimated toxicity of the Iron and Steel Manufacturing Category discharges in the toxicity rankings databases result from cyanide, chlorine, chromium, fluoride, and aluminum discharges. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- Two facilities, US Steel Corporation–Clairton Works, and Mountain State Carbon, LLC, contribute the majority of the DMR database cyanide discharges for the Iron and Steel Manufacturing Category. US Steel Corporation's cyanide discharges do not exceed the permit limitations and likely have a high load because of their flow. US Steel Corporation's high flow is expected as it has historically been a top coke producer in the United States. Mount State Carbon's 2009 November cyanide quantity exceeds its mass-based permit limitation. EPA further determined that the facility was not in compliance during eleven months in 2010. However, the compliance issues appeared to be resolved in 2011. Therefore, EPA will continue to review this facility's cyanide discharges in future years, but notes that these discharges are not representative of typical cokemaking facility discharges.

- The chlorine discharges are reported by one facility, ISG Sparrows Point, Inc. Due to an overestimation in the DMR database, ISG Sparrows Point's chlorine TWPE was corrected from 8,690 to 1,320. EPA concludes that the chlorine discharge does not represent a hazard priority.

- Database errors were also identified for discharges of chromium. After correcting these errors, the Iron and Steel Manufacturing Category TWPE from chromium decreased from 16,000 to 463 and does not represent a hazard priority.

- One facility, Arcelormittal Weirton Inc., accounted for 51 percent of the 2009 DMR fluoride TWPE. The concentrations ranged from 5.6 mg/L to 14.8 mg/L.

EPA determined that current technologies are achieving effluent fluoride concentrations between 2 mg/L and 15 mg/L. Therefore, EPA does not consider these discharges a hazard priority at this time.

- Three facilities, Ipsco Tubulars Inc., Nucor Steel Tuscaloosa Inc., and Nucor Steel Decatur LLC, contribute the majority of the aluminum discharges for the Iron and Steel Manufacturing Category. The aluminum discharges for all three facilities result from stormwater, and all effluent aluminum concentrations exceed treatable levels. EPA is considering facility-specific permitting support to be the most appropriate to control these facilities' fluoride discharges.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 Iron and Steel Manufacturing Category TWPE from 230,000 to 207,000. As new data becomes available, EPA will continue to review the Iron and Steel Category discharges to determine if they are properly controlled.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

9.10 Iron and Steel Manufacturing Category References

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10. LANDFILLS (40 CFR PART 445)

EPA selected the Landfills Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. The Final 2010 Plan summarizes the results of EPA's previous review of this industry in 2010 (U.S. EPA, 2011). This section summarizes the results of the 2011 Annual Reviews, which focused on discharges of fluoride, boron, and metals, including copper, manganese, and iron, due to their high TWPE relative to the other pollutants in the Landfills Category and the findings from the 2010 Annual Reviews.

10.1 Landfills Category 2011 Toxicity Rankings Analysis

Table 10-1 compares the toxicity rankings analysis results for the Landfills Category from the 2009 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases increased from discharge years 2007 to 2009. The estimated 2009 DMR TWPE accounts for approximately 99 percent of the combined 2009 DMR and TRI TWPE, similar to previous years of data.

Table 10-1. Landfills Category TRI and DMR Discharges for the 2009 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Landfills Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2007	2009	83	15,300	15,400
2008	2010	781	191,000	192,000
2009	2011	2,750	219,000	222,000

Sources: *TRI Releases 2007 v2, DMRLoads2007_v4, TRIReleases2008_v3, DMRLoads2008_v3; TRIReleases2009_v2;* and *DMRLoads2009_v2*.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2007 include only major dischargers. DMR 2008 data include both minor and major dischargers.

10.2 Landfills Category Pollutants of Concern

EPA's review of the Landfills Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 10-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3,* respectively).

The top five DMR-reported pollutants in 2009 contribute more than 87 percent of the total category TWPE. EPA determined that three facilities account for the majority of the top five DMR-reported pollutants. EPA also continued its review of iron, the fifth top DMR-reported pollutant, as a continuation of the findings from the 2010 Annual Reviews (U.S. EPA, 2011).

Table 10-2. Landfills Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Copper	Pollutants not reported in the top five 2008 DMR-reported pollutants.			1	57	73,100
Fluoride				2	25	52,900
Boron				3	29	47,000
Manganese	3	55	15,700	4	48	18,200
Iron	2	146	31,300	5	122	7,420
Vanadium	1	11	45,400	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
Arsenic	4	47	15,100			
Calcium	5	18	10,900			
Landfills Category Total	**NA**	**232[b]**	**191,000**	**NA**	**201[b]**	**219,000**

Sources: *DMRLoads2008_v3* and *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

10.3 Landfills Category Top Dischargers in DMR

Table 10-3 presents the top three facilities discharging the pollutants of concern for the Landfills Category in the 2009 DMR database: Butler County Landfill in Poplar Bluff, MO; Tunnel Hill Reclamation in New Lexington, OH; and BFI Backridge Sanitary Landfill in La Grange, MO. The majority (86 percent) of the top pollutant discharges in 2009 were from these three facilities, and this section accordingly focuses on them.

Table 10-3. Top Facilities Discharging Pollutants of Concern in the 2009 DMR Database

Facility	Location	Top Pollutants Discharged	Combined Top Pollutant DMR Pounds Discharged	Combined Top Pollutant DMR TWPE
Butler County Landfill	Poplar Bluff, MO	Copper, Fluoride, Boron	7,340,000	169,000
Tunnel Hill Reclamation	New Lexington, OH	Manganese	225,000	15,700
BFI, Backridge Sanitary Landfill	La Grange, MO	Iron	782,000	4,380
Total			**207,000,000**	**219,000**

Source: DMRLoads2009_v2.

10.3.1 Butler County Landfill

Table 10-4 presents the discharges in the 2009 DMR database for Butler County Landfill. Approximately 97 percent of the facility's TWPE is from copper, fluoride, and boron discharges.

Table 10-4. Butler County Landfill 2009 Top Discharges in the DMR Database

Pollutant	Total Pounds	Total TWPE	Percent of Facility Total TWPE
Copper	115,000	72,500	41.6%
Fluoride	1,690,000	50,700	29.1%
Boron	5,530,000	46,100	26.5%
Remaining pollutants[a]	2,410,000	4,690	2.8%
Total	**9,750,000**	**174,000**	**100%**

Source: DMRLoads2009_v2.

[a] Remaining pollutants discharged by Butler County Landfill include sulfate, chlorides, total suspended solids, nickel, biological oxygen demand (BOD), manganese, antimony, barium, and lead.

The copper, fluoride, and boron discharges for Butler County Landfill are from outfalls 001 and 002. Table 10-5 presents the discharge data in the DMR Loadings Tool for 2009. EPA contacted the Missouri Department of Natural Resources (MO DNR) to confirm the 2009 copper discharges. MO DNR indicated that the September 2009 copper concentration for outfall 001 was 21 micrograms per liter (µg/L), not 21 milligrams per liter (mg/L) (Cozad, 2011). Because fluoride and boron concentrations from the DMR Loadings Tool were similar in order of magnitude to the original copper concentration, EPA converted the concentrations from mg/L to µg/L. Using the corrected concentrations, the facility's TWPE decreased from 174,000 to 4,765, a reduction of over 97 percent.

Table 10-5. Butler County Landfill 2009 Monthly Top Pollutant Discharge Data

Outfall	Pollutant	Monitoring Period Date	DMR Loadings Tool Concentration (mg/L)	Corrected Concentration (mg/L)
001	Copper	30-Sep-09	21	0.021
002	Fluoride	30-Sep-09	370	0.37
001	Boron	30-Sep-09	700	0.7
002	Boron	30-Sep-09	370	0.37

Sources: DMR Loadings Tool and MO DNR contact (Cozad, 2011).

10.3.2 Tunnel Hill Reclamation

Table 10-6 presents the discharges in the 2009 DMR database for Tunnel Hill Reclamation. All of the facility TWPE is from manganese discharges.

Table 10-6. Tunnel Hill Reclamation 2009 Top Discharges in the DMR Database

Pollutant	Total Pounds	Total TWPE	Percent of Facility Total TWPE
Manganese	225,000	15,700	100%
Total suspended solids	2,910	0	0%
Total	**228,000**	**15,700**	**100%**

Source: DMRLoads2009_v2.

All of the manganese discharges for Tunnel Hill Reclamation are from outfall 001. Table 10-7 presents the 2009 discharge data from the DMR Loadings Tool for outfall 001. The DMR Loadings Tool uses the facility quantities for August through December 2009 to calculate the facility's annual manganese load. Because the DMR Loadings Tool prioritizes the quantity value for the calculation, the quantities reported as "NR" were not included in the load calculation. However, the facility also reported the flow and monthly manganese concentration data in the 2009 DMR data, even for reporting periods January through July, where the quantity not reported. EPA hand calculated the monthly quantities using the reported manganese concentrations and flow, also presented in Table 10-7. The calculated quantities are at least three orders of magnitude less than the quantities in the DMR Loadings Tool. EPA determined that the monthly quantities used to calculate the load in the DMR Loadings Tool are incorrect. After correcting the monthly quantities, Tunnel Hill Reclamation's manganese discharges decrease from 15,700 to 10.9 TWPE, a reduction of over 99 percent.

Table 10-7. Tunnel Hill Reclamation 2009 Monthly Manganese Discharges for Outfall 001

Monitoring Period Date	DMR Loadings Tool Data			EPA Calculated Quantity[a] (kg/day)
	Average Quantity Reported (kg/day)	Average Concentration Reported (mg/L)	Average Flow Reported (MGD)	
31-Jan-09	NR	1.7325	0.0607	0.398
28-Feb-09	NR	1.33	0.1274	0.641
31-Mar-09	NR	0.248	0.0635	0.060
30-Apr-09	NR	0.5575	0.0926	0.195
31-May-09	NR	0.6375	0.0729	0.176
30-Jun-09	NR	0.346	0.0618	0.081
31-Jul-09	NR	0.616	0.0638	0.149
31-Aug-09	545	0.545	0.0519	0.107
30-Sep-09	315	0.315	0.0569	0.068
31-Oct-09	1,594	1.594	0.0654	0.395
30-Nov-09	654.3	0.654	0.02270	0.056
31-Dec-09	213.5	0.214	0.0306	0.025

Sources: DMR Loadings Tool and Envirofacts.

[a] EPA calculated the quantity using the average concentration and average flow.

10.3.3 BFI Backridge Sanitary Landfill

Table 10-8 presents the discharges in the 2009 DMR database for BFI Backridge Sanitary Landfill. The majority of the facility's TWPE (over 99 percent) is from iron.

Table 10-8. BFI Backridge Sanitary Landfill 2009 Discharges in the DMR Database

Pollutant	Total Pounds	Total TWPE	Percent of Facility Total TWPE
Iron	782,000	4,380	>99%
Lead	1.32	2.96	<1%
Remaining pollutants[a]	156,440	0	0%
Total	**938,700**	**4,380**	**100%**

Source: DMRLoads2009_v2.

[a] Remaining pollutants discharged by BFI Backridge Sanitary Landfill include total dissolved solids, chlorides, sulfates, and BOD.

The iron discharges for BFI Backridge Sanitary Landfill are from outfalls 001 and 002. Table 10-9 presents the 2009 iron discharge data in the DMR Loadings Tool and Envirofacts for outfalls 001 and 002. EPA compared the data from the DMR Loadings Tool to Envirofacts and concluded that a data entry error in September 2009 had resulted in iron concentrations 1,000 times higher than March 2009 concentrations. Using the corrected concentrations, BFI Backridge Sanitary Landfill's discharges decreased from 4,380 to 6.9 TWPE, a reduction of over 99 percent.

Table 10-9. BFI Backridge Sanitary Landfill 2009 Monthly Iron Discharges

Outfall	Monitoring Period Date	DMR Loadings Tool Average Concentration (mg/L)	Envirofacts Average Concentration (mg/L)	Corrected Average Concentration (mg/L)
001	31-Mar-09	0.86	0.86	0.86
001	30-Sep-09	950	NR	0.95
002	31-Mar-09	1.8	1.8	1.8
002	30-Sep-09	6300	NR	6.3

Sources: DMR Loadings Tool and Envirofacts.
NR: Not reported. Concentrations were not in Envirofacts.

10.4 Landfills Category Iron Discharges in DMR

As part of the 2010 reviews of the Landfills Category, EPA compared iron discharges in the 2008 DMR database to treatable levels typical of chemical precipitation and biological treatment. See Section 8.5 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* for additional information on the methodology used to review the iron concentration data, or the memorandum titled "Methodology for Analyzing Landfill Iron Concentrations in the 2008 DMR Loadings Tool" (U.S. EPA, 2011; ERG, 2010).

For the 2010 Annual Reviews, EPA determined that 89 percent of iron concentrations in the 2008 DMR database were within treatability concentration ranges (ERG, 2010). Because EPA was concerned about the quality of data, EPA concluded that additional review was necessary and solicited comments as part of the 2010 Final Plan. See 76 FR 66286 (October 26, 2011).

For the 2011 Annual Reviews, EPA used the same methodology to review iron concentration data for the Landfills Category. EPA determined that there were 3,232 iron concentrations in the DMR Loadings Tool for 2009 for facilities in the Landfills Category. EPA removed 0 mg/L or blank concentrations and concentrations reported below the detection limit for all reporting periods, resulting in 1,593 iron concentrations for the 2011 analysis. Because facilities report multiple concentrations for each monitoring period, EPA prioritized the selection of the average concentration and then the maximum (ERG, 2010).

Then, EPA compared the iron concentrations to the EPA Method 200.7 method detection limit (MDL) for iron to determine if the concentrations were at detectable levels. EPA excluded the 66 iron concentrations (approximately 4 percent) that were below the MDL. EPA calculated the resulting median, average, and maximum of the remaining iron concentrations. EPA analyzed the median concentration rather than the average or maximum because of suspected data entry errors that would skew the average and maximum iron concentrations (ERG, 2010).

EPA then compared the median iron concentration to available chemical precipitation and biological treatability data. EPA chose these specific wastewater treatment technologies because they were the technologies used to determine the best available technology basis used to develop limits for the RCRA Subtitle C Hazardous Waste Landfills. EPA used treatability data for chemical precipitation and biological treatment already established during previous annual reviews[8] (U.S. EPA, 2009).

Table 10-10 presents the 2008 and 2009 median iron concentrations compared to the EPA Method 200.7 MDL and treatability concentrations for chemical precipitation and biological treatment. Similar to the 2010 findings, Table 10-10 shows that the median concentration in landfill discharges is below the maximum concentrations achievable by chemical precipitation and biological treatment.

[8] As part of the Steam Electric Power Generating Point Source Category Detailed Study, EPA collected treatability data for chemical precipitation and biological treatment systems. Iron was included in the treatability data (U.S. EPA, 2009).

Table 10-10. Iron Concentrations in the 2008 and 2009 DMR Database Compared to Treatability Concentrations

Discharge Year	Number of Facilities Reporting Pollutant[a]	Median Concentration (mg/L)	EPA 200.7 MDL (mg/L)	Chemical Precipitation Treatment Concentration Range (mg/L)	Biological Treatment Concentration Range (mg/L)	Percent of Concentrations Above Chemical Precipitation Range	Percent of Concentrations Above Biological Treatment Range
2008	146	1.21	0.03	0.019–6	ND (0.0022)–23	11%	2%
2009[b]	122	0.85				8%	1.5%

Sources: DMR Loadings Tool; Method 200.7 Determination of Metals and Trace Elements in Water and Wastes by Inductively Couple Plasma-Atomic Emission Spectrometry (U.S. EPA, 1994); and 2009 Steam Electric Power Generating Point Source Category: Final Detailed Study Report (U.S. EPA, 2009).

a Number of facilities reporting iron concentrations after EPA excluded outfalls with all non-detect concentrations and concentrations reported as 0 mg/L.

b EPA used the corrected iron concentration for BFI Backridge Sanitary Landfill in the 2009 iron median concentration.

MDL: Method detection limit.

ND: Non-detect. Detection limit indicated in parentheses.

The 2009 median iron concentration for all outfalls is less than the biological treatment or chemical precipitation treatability concentrations and less than the 2008 median iron concentration for all outfalls. Approximately 92 percent of the iron concentrations are below the chemical precipitation treatability (below 6 mg/L) and 98.5 percent are below the biological treatment treatability (below 23 mg/L). The remaining iron concentrations above the chemical precipitation treatment range are reported by a total of 37 facilities, four of which are also above the biological treatment range. EPA determined that approximately 75 percent of the facilities reporting iron concentrations above treatable levels are located in Missouri and Kentucky.

10.5 Landfills Category Conclusions

The estimated toxicity of the Landfills Category discharges results mainly from the discharges of metals. During the 2010 Annual Reviews, EPA identified many data entry errors in the Landfills Category DMR data, because they are predominately minor discharges. Based on corrected discharge data, further review at this time is unnecessary. Therefore, EPA concludes the following:

- Database errors were identified for copper, fluoride, boron, manganese, and iron. Making these corrections decreases the Landfills Category TWPE by over 85 percent, from 221,000 to 32,400. With this reduction, the Landfills Category would rank 23rd, which is outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

- Ninety-two percent of iron concentrations in the 2009 DMR database are within treatability concentration ranges.

- Because the majority of 2009 DMR iron concentrations are within the treatability concentration ranges and approximately 85 percent of the TWPE was a result of database errors, EPA will continue to review the Landfills category iron discharges in future years.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with “(3)” in the “Findings” column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

10.6 Landfills Category References

1. ERG. 2010. Eastern Research Group, Inc. Memorandum to William Swietlik, U.S. EPA, From Jessica Wolford and Elizabeth Sabol, Eastern Research Group, Inc., Re: Methodology for Analyzing Landfill Iron Concentrations in the 2008 DMR Loadings Tool. (October). EPA-HQ-OW-2008-0517 DCN 07277.

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2009 DMR Lead Discharges for Butler County Landfill." (February 23). EPA-HQ-OW-2010-0824. DCN 07531.

3. U.S. EPA. 1994. Method 200.7 Determination of Metals and Trace Elements in Water and Wastes by Inductively Couple Plasma-Atomic Emission Spectrometry Revision 4.4. Washington, DC. (Unknown). Available online at: http://www.epa.gov/waterscience/methods/method/files/200_7.pdf.

4. U.S. EPA. 2009. *Steam Electric Power Generating Point Source Category: Final Detailed Study Report*. EPA-821-R-008. Washington, DC. (October). EPA-HQ-OW-2008-0517-0413.

5. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-820R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

6. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

11. MEAT AND POULTRY PRODUCTS (40 CFR PART 432)

EPA selected the Meat and Poultry Products (Meat and Poultry) Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. This section summarizes the results of the 2011 Annual Reviews associated with the Meat and Poultry Category. EPA focused on discharges of nitrate compounds because of their high TWPE relative to the other pollutants in the Meat and Poultry Category.

11.1 Meat and Poultry Category Background

This subsection provides the background on the Meat and Poultry Category including a brief profile of the Meat and Poultry industry and background on 40 CFR Part 432.

11.1.1 Meat and Poultry Industry Profile

The meat and poultry industry includes facilities engaged in the slaughtering, dressing and packing of meat and poultry products for human consumption and/or animal food and feeds. Meat and poultry products for human consumption include meat and poultry from cattle, hogs, sheep, chickens, turkeys, ducks and other fowl as well as sausages, luncheon meats and cured, smoked or canned or other prepared meat and poultry products from purchased carcasses and other materials. Meat and poultry products for animal food and feeds include animal oils, meat meal and facilities that render grease and tallow from animal fat, bones and meat scraps (40 CFR §432.1) EPA considered the following eight industrial categories as part of the Meat and Poultry Products Category:

- Other Animal Food Manufacturing (Meat and Poultry Products)
- Animal (except Poultry) Slaughtering
- Meat Processed from Carcasses
- Rendering and Meat Byproduct Processing
- Poultry Processing
- All Other Miscellaneous Food Manufacturing (Meat and Poultry Products)
- Broilers and Other Meat Type Chicken Production
- Dog and Cat Food Manufacturing

Because the sources of the discharge monitoring report (DMR) data used to develop *DMRLoads2009* report facilities by Standard Industrial Classification (SIC) code and the U.S. Economic Census and Toxics Report Inventory (TRI) report data by North American Industry Classification System (NAICS) code, EPA reclassified the 2009 DMR data by the equivalent NAICS code. See Section 4.2.1.2 of the 2009 SLA Report for additional details (U.S. EPA, 2009). Table 11-1 lists the number of facilities from the 2007 U.S. Economic Census and the toxicity rankings databases for the eight industrial categories with operations in the Meat and

Poultry Category. The U.S. Economic Census includes more facilities than the toxicity rankings databases for many reasons: facilities may not meet TRI-reporting thresholds, facilities may discharge to a publicly owned treatment works (POTW), and some facilities in the U.S. Economic Census are distributors or sales facilities, not manufacturers.

Table 11-1 also includes the number of meat and poultry facilities by major or minor discharge status in the 2009 DMR database. As described in Section 2.1.5, permitting authorities classify discharges as major or minor based on the potential impact of the discharge (U.S. EPA, 2011). In general, major discharges are expected to impact receiving waters if not controlled; minor discharges may, or may not, adversely impact receiving waters if not controlled. Also as described in 2.1.5, the PCS and ICIS-NPDES databases include data only for a limited set of minor discharges (i.e., if the state or other permitting authority chooses to include these data). Table 11-1 shows that approximately 78 percent of the Meat and Poultry Category discharges in the 2009 DMR database are minor discharges. Table 11-1 also presents the type of discharges reported by facilities in the 2009 TRI database. The majority of the meat and poultry facilities reporting to TRI reported direct discharges to surface waters.

Table 11-1. Number of Meat and Poultry Facilities

2007 U.S. Economic Census	2009 DMR			2009 TRI			
	Total	Minor	Major	Total	Indirect Dischargers Only	Direct Dischargers Only	Both Indirect and Direct Dischargers
6,357	189	147	42	173	64	92	17

Source: U.S. Economic Census (2007); *TRIReleases2009_v2;* and *DMRLoads2009_v2*.

11.1.2 40 CFR Part 432

EPA most recently updated effluent limitations guidelines (ELGs) for the Meat and Poultry Category (40 CFR Part 432) on September 8, 2004 (69 FR 54476). This category consists of 12 subcategories that apply to the manufacture of products and product groups, as shown in Table 11-2 with corresponding applicability, regulated pollutants, and limitations. In addition to best practicable control technology (BPT), best available technology economically achievable (BAT), and new source performance standards (NSPS) are also included in 40 CFR Part 432. Table 11-2 presents the BAT-based ELG limits for the Meat and Poultry Category.

Table 11-2. Applicability, Regulated Pollutants, and BAT ELG Limits for the Meat and Poultry Category

Subpart	Subcategory Title	Subcategory Applicability	Ammonia as N[a]		Total Nitrogen[a]	
			Max Daily (mg/L)	Max Monthly Average (mg/L)	Max Daily (mg/L)	Max Monthly Average (mg/L)
A[b]	Simple Slaughterhouses	Process wastewater discharges resulting from production of meat carcasses by simple slaughterhouses.	8.0	4.0	194	134
B[b]	Complex Slaughterhouses	Process wastewater discharges resulting from production of meat carcasses by complex slaughterhouses.	8.0	4.0	194	134
C[b]	Low-processing Packinghouses	Process wastewater discharges resulting from production of meat carcasses by low-processing packinghouses.	8.0	4.0	194	134
D[b]	High-processing Packinghouses	Process wastewater discharges resulting from production of meat carcasses by high-processing packinghouses.	8.0	4.0	194	134
E[c]	Small Processors	Process wastewater discharges resulting from production of finished meat products (i.e.: fresh meat cuts, smoked products, canned products, hams, sausages, and luncheon meats) by a small processor.	NA	NA	NA	NA
F[d]	Meat Cutters	Process wastewater discharges resulting from production of fresh meat cuts (i.e.: steaks, roasts, and chops) by a meat cutter.	8.0	4.0	194	134
G[d]	Sausage and Luncheon Meats Processors	Process wastewater discharges resulting from production of fresh meat cuts, sausage, bologna, and other luncheon meats by a sausage and luncheon meat processor.	8.0	4.0	194	134
H[d]	Ham Processors	Process wastewater discharges resulting from production of hams by a ham processor.	8.0	4.0	194	134
I[d]	Canned Meats Processors	Process wastewater discharges resulting from production of canned meats by a canned meats processor.	8.0	4.0	194	134

Table 11-2. Applicability, Regulated Pollutants, and BAT ELG Limits for the Meat and Poultry Category

Subpart	Subcategory Title	Subcategory Applicability	Ammonia as N[a]		Total Nitrogen[a]	
			Max Daily (mg/L)	Max Monthly Average (mg/L)	Max Daily (mg/L)	Max Monthly Average (mg/L)
J	Renderers	Process wastewater discharges resulting from production of meat meal, dried animal by-product residues (tankage), animal oils, grease and tallow, and hide curing, by a renderer.	0.14 (pounds per 1000 lbs (g/kg) of raw material)	0.07 (pounds per 1000 lbs (g/kg) of raw material);	194	134
K[e]	Poultry First Processing	Process wastewater discharges resulting from slaughtering of poultry, further processing of poultry and rendering of material derived from slaughtered poultry.	8.0	4.0	147	103
L[f]	Poultry Further Processing	Process wastewater discharges resulting from further processing of poultry.	8.0	4.0	147	103

Source: 40 CFR §432

[a] Units are mg/L unless otherwise noted.

[b] Any existing point source subject to this subpart that slaughters more than 50 million pounds per year (in units live weight kill (LWK)) must achieve the applicable total Nitrogen and Ammonia as N BAT based limits.

[c] The Small Processors Subcategory does not have BAT based limits; however, it does have BPT and NSPS based limits for BOD5, fecal coliform, oil and gas, and TSS.

[d] The total Nitrogen BAT based limit only applies to facilities with more than 50 million pounds per year of final product. The Ammonia as N BAT based limit applies to all facilities.

[e] Any existing point source subject to this subpart that slaughters more than 100 million pounds per year (in units LWK) must achieve the applicable total Nitrogen and Ammonia as N BAT based limits.

[f] Any existing point source subject to this subpart that slaughters more than 7 million pounds per year (in units LWK) must achieve the applicable total Nitrogen and Ammonia as N BAT based limits.

NA: Not applicable.

11.2 Meat and Poultry Category 2011 Toxicity Rankings Analysis

Table 11-3 compares the toxicity rankings analysis results for the Meat and Poultry Products Category from the 2009 through 2011 Annual Reviews. The combined DMR and TRI TWPE decreased from discharge years 2007 to 2009. The estimated 2009 TRI TWPE accounts for approximately 76 percent of the combined 2009 DMR and TRI TWPE.

Table 11-3. Meat and Poultry Category TRI and DMR Discharges for the 2009 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Meat and Poultry Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2007[c]	2009	35,900	536,000	572,000
2008[c]	2010	61,600	15,700	77,300
2009	2011	53,800	17,200	71,000

Sources: *TRI Releases 2007 v2, DMRLoads2007_v4, TRIReleases2008_v3, DMRLoads2008_v3; TRIReleases2009_v2;* and *DMRLoads2009_v2*.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2007 include only major dischargers. DMR 2008 data include both minor and major dischargers.

[c] EPA did not review discharges from the Meat and Poultry Category as part of the 2009 and 2010 Annual Reviews because the category ELGs were promulgated in 2004. In general, EPA does not review discharge data for an industrial point source category if EPA established, revised, or reviewed the category's ELGs within seven years of the annual review.

11.3 Meat and Poultry Category Pollutants of Concern

EPA's review of the Meat and Poultry Category focused on the 2009 TRI discharges because the 2009 TRI data dominate the category's combined TWPE. Table 11-4 lists the five pollutants with the highest TWPE based on results from the 2011 Annual Reviews (*TRIReleases2009_v2*). The top TRI-reported pollutant in 2009, nitrate, contributes more than 87 percent of the category's 2009 TRI TWPE. As a result, EPA's additional review for the 2011 Annual Reviews focused on nitrate. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they account for only 13 percent of the 2009 Meat and Poultry Category TRI TWPE; however, EPA did review DMR data to aid in the review of the 2009 TRI nitrate discharges.

Table 11-4. Meat and Poultry Category Top TRI Pollutants

Pollutant	2009 TRI Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE
Nitrate compounds[b]	1	116	46,900
Chlorine	2	4	2,840
Lead and lead compounds	3	1	1,590
Mercury and mercury compounds	4	1	1,480
Ammonia	5	126	853
Meat and Poultry Category Total	**NA**	**173[c]**	**53,800**

Source: *TRIReleases2009_v2*.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] The TRI list of chemicals within water-dissociable nitrate compounds category and guidance for reporting includes 49 pollutants. A full list of TRI pollutants included in the "Nitrate Compounds" category is available online at: http://www.epa.gov/tri/guide_docs/pdf/2000/nitrates2000.pdf.

[c] Number of facilities reporting a TWPE of greater than zero.

11.4 Meat and Poultry Category Nitrate Compound Discharges in TRI

Nitrate compound discharges from meat and poultry facilities in the 2009 TRI database account for 87 percent of the category's 2009 TRI TWPE. Table 11-5 presents the facilities that account for the nitrate compound discharges in the 2009 TRI database.

Table 11-5. Meat and Poultry Category Nitrate Compounds Dischargers in the 2009 TRI Database

Facility Name	Location	Subcategory	Nitrate Compound Pounds Released	Nitrate Compound TWPE	Facility Percent of Nitrate Compound Category TWPE
Tyson Fresh Meats, Inc.	Lexington, NE	B	4,990,000	3,730	7.94 %
Tyson Fresh Meats, Inc., Joslin IL	Hillsdale, IL	B	4,450,000	3,320	7.08 %
Cargill Meat Solutions Corp.	Schuyler, NE	B	3,850,000	2,870	6.12 %
Smithfield Packing, Co., Inc. Tar Heel Div	Tar Heel, NC	Undetermined	3,750,000	2,800	5.96 %
Cargill Meat Solutions Corp.	Beardstown, IL	Undetermined	3,650,000	2,730	5.81 %
Lewiston Processing Plant	Lewiston Woodville, NC	Undetermined	3,260,000	2,440	5.19 %
Accomac Processing Plant	Accomac, VA	Undetermined	2,080,000	1,550	3.3 %
Farmland Foods, Inc.	Crete, NE	B	1,780,000	1,330	2.84 %
JBS Plainwell	Plainwell, MI	Undetermined	1,750,000	1,300	2.78 %
Cargill Meat Solutions Corp.	Wyalusing, PA	B	1,670,000	1,250	2.66 %
Tyson Fresh Meats, Inc.	Columbus Junction, IA	Undetermined	1,620,000	1,210	2.58 %
Tyson Foods, Inc., Blountsville Processing Plant	Blountsville, AL	Undetermined	1,490,000	1,110	2.37 %
Pilgrim's Pride, Corp., Mt. Pleasant Complex	Mount Pleasant, TX	Undetermined	1,390,000	1,040	2.22 %
Remaining facilities reporting nitrate compounds discharges[a]			27,100,000	20,300	43.2 %
Total			**62,900,000**	**46,900**	**100 %**

Source: TRIReleases2009_v2.

[a] There are 103 remaining facilities that have nitrate compounds discharges in the 2009 TRI database, which account for approximately 43 percent of the category's nitrate compounds 2009 TRI TWPE.

Several forms of nitrogen are pollutants of concern in the meat and poultry processing wastewaters: total Kjeldahl nitrogen (TKN), ammonia nitrogen, and nitrite plus nitrate nitrogen. Because protein is the principal component of meat and blood, meat and poultry wastewaters can contain relatively high concentrations of nitrogen. Nitrite and nitrate nitrogen compounds are usually present in process wastewater at concentrations less than 1 mg/L prior to biological treatment. Nitrite and nitrate concentrations can be higher than the reported 1 mg/L if nitrite and nitrate salts are used for curing meat or poultry (U.S. EPA, 2002).

Nitrite and nitrate nitrogen is rarely present before aerobic biological treatment due to the lack of oxygen necessary for microbially mediated nitrification. Therefore, the principal source of nitrite and nitrate nitrogen following treatment is nitrification. Biological treatment is often required, at least seasonally, to satisfy effluent limitations for the discharge of ammonia nitrogen to surface waters. Many NPDES permits are written with seasonal limits for ammonia because the lower pH and temperature of the receiving waters during winter reduce the toxicity of ammonia by converting it to ammonium (U.S. EPA, 2002).

The principal concern about oxidized nitrogen in the wastewater is its role in eutrophication. An additional concern is its potential for increasing ambient surface water nitrate nitrogen concentrations above the national maximum contaminant level (MCL) of 10 mg/L in source waters used for public drinking water supplies (U.S. EPA, 2002).

The biological removal of nitrogen from wastewaters is a two-step process beginning with nitrification followed by denitrification. Under anaerobic conditions, ammonia is oxidized to nitrite, which is oxidized to nitrate in the process of nitrification. Following the anaerobic conditions, nitrite and nitrate are reduced microbially by denitrification, producing nitrogen gas as the principal end product (U.S. EPA, 2002). Table 11-6 lists the BAT options for the meat and poultry subcategories.

Table 11-6. BAT Treatment Basis for the Meat and Poultry Subcategories

Subcategory	Treatment Unit Processes (Pollutants Removed)
A–D	Dissolved air flotation, lagoon, nitrification, denitrification, and disinfection
E	NA (no BAT limits)
F–I	Dissolved air flotation, lagoon, nitrification, denitrification, and disinfection
K	Dissolved air flotation, nitrification, denitrification, and disinfection
L	Dissolved air flotation, lagoon, nitrification, denitrification, and disinfection
J	Dissolved air flotation, nitrification, denitrification, and disinfection

Source: Development Document for the Proposed Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Industry Point Source Category (U.S. EPA, 2002).

EPA determined that five out of the top 13 nitrate compound discharging facilities are complex slaughterhouses regulated by Subpart B of the Meat and Poultry ELGs. Subpart B (Complex Slaughterhouses) applies to discharges of process wastewater associated with the production of meat carcasses, in whole or in part, by complex slaughterhouses. Process wastewater includes water from animal holding areas at these facilities. By definition, a complex slaughterhouse is a slaughterhouse that provides extensive processing of the by-products of meat slaughtering (40 CFR §432.20 and §432.21). The BAT treatment basis for Subpart B is dissolved air flotation, lagoons, nitrification, denitrification, and disinfection (U.S. EPA, 2002). This subsection provides information on each facility's operations and nitrate compounds discharges in the 2009 TRI database.

11.4.1 Tyson Fresh Meats, Inc.

Tyson Fresh Meats, Inc. (Tyson Lexington), in Lexington, NE is a complex beef cattle slaughterhouse (NDEQ, 2004a). The facility's nitrate compound discharges account for approximately 8 percent of the 2009 TRI nitrate compound TWPE. The facility permit recognizes wastewater discharges from two outfalls, 001 and 002. Outfall 001 discharges treated process wastewater from the slaughter of beef cattle. The process wastewater is treated by a dissolved air flotation system, two anaerobic lagoon cells, a plant with two activated sludge basins, chlorination, dechlorination, and storage ponds for off specification wastewaters. Outfall 002 is an emergency bypass, to be used only when outfall 001 is unavailable for discharge. No discharge is allowable without prior written authorization. The facility permit does not limit nitrate discharges from outfall 001 or 002; however, it does seasonally limit ammonia (NDEQ, 2004a).

11.4.2 Tyson Fresh Meats, Inc.

Tyson Fresh Meats, Inc. (Tyson Joslin), in Hillsdale, IL is a complex slaughterhouse. Wastewater at the facility is generated from slaughtering, process and rendering, boilers, yard washing, hides cleaning/curing, tannery, tannery mean house and other facility operations (IL EPA, 2004). The facility's nitrate compound discharges account for approximately 7 percent of the 2009 TRI nitrate compounds TWPE. The plant operations result in an average discharge of 3.17 MGD of treated process wastewater, boiler blowdown, sanitary waste, miscellaneous waste, stormwater and cooling water discharges from outfall 001. The facility permit does not limit nitrate discharges from outfall 001; however, it does seasonally limit ammonia (IL EPA, 2004).

The facility reports 988,000 pounds of nitrate discharged from outfall 001 in the 2009 DMR database. As shown in Table 11-5, the facility reports 4,450,000 pounds of nitrate compounds in the 2009 TRI database, a difference of 3,460,000 pounds. Because of the difference between the 2009 DMR and 2009 TRI data, the facility is likely overestimating the amount of nitrate compounds reported to the 2009 TRI database. It is common for facilities to include non-industrial pollutant loads, such as loads from stormwater, based on TRI reporting guidance. Additionally, facilities often estimate TRI pollutant loadings based on inventory, production, and emission factors, not actual sampling data as in the DMR database.

11.4.3 Cargill Meat Solutions Corporation

Cargill Meat Solutions Corporation's facility (Cargill Schuyler) in Schuyler, NE is a complex beef slaughterhouse and meat processing plant (NDEQ, 2004b). The facility's nitrate compound discharges account for approximately 6 percent of the 2009 TRI nitrate compounds TWPE. The facility permit recognizes wastewater discharges from outfalls 001, 002, and 003. Outfall 001 discharges treated process wastewater from the beef slaughterhouse. The treatment at the plant includes a dissolved air flotation unit, anaerobic lagoon cells, a four-chambered sequence batch reactor (an activated sludge plant), a chlorine contact basin, and dechlorination. Outfall 002 discharges non-contact cooling water from ammonia condensers for meat coolers. Outfall 003 is a land application of treated effluent discharge to various agricultural sites. The source of the water is the treated process wastewater stored in the wet storage lagoon cell. The facility permit does not limit nitrate discharges for outfalls 001, 002, or 003; however, it does seasonally limit ammonia (NDEQ, 2004b).

11.4.4 Farmland Foods, Inc.

Farmland Foods, Inc. (Farmland Foods) in Crete, NE is a complex swine slaughterhouse that slaughters hogs and processes them into fresh pork products as well as smoked meat products. All byproducts are cooked down in the rendering process and the non-condensable vapors are discharged through an air scrubbing system of a water curtain vortex. The majority of process water originates from floor drains throughout the plant (i.e., drains from the kill floor, cut floor, and cleanup area) (NDEQ, 2005). The facility's nitrate compounds discharge account for approximately 2.8 percent of the 2009 TRI nitrate compound TWPE. The facility permit recognizes wastewater discharges from outfalls 001 and 002 (NDEQ, 2005).

Outfall 001 discharges wastewater from the cut floor, kill floor, as well as cleanup wastewater, sanitary water, and non-contact cooling water. Wastewater treatment at the facility includes screening, dissolved air flotation, two anaerobic lagoons, an anoxic tank, three aeration basins, two final clarifiers (activated sludge), a chlorine contact basin and dechlorination, and a sludge holding lagoon. Outfall 002 discharges single-pass, non-contact cooling water. The facility permit does not limit nitrate discharges from outfalls 001 or 002; however, it does limit ammonia (NDEQ, 2005).

11.4.5 Cargill Meat Solutions Corporation

Cargill Meat Solutions Corporation's facility (Cargill Wyalusing) in Wyalusing, PA is a complex slaughterhouse that butchers and packages beef meat products (PA DEP, 2004). The facility's nitrate compounds discharges account for approximately 2.6 percent of the 2009 TRI nitrate compound TWPE. The facility permit recognizes wastewater discharges from outfall 001. Outfall 001 discharges wastewater from the complex slaughterhouse process, the air scrubber, boiler blowdown, and sewage waters. Wastewater treatment at the facility includes screening, anaerobic lagoons, aeration, clarification, chlorination, dechlorination, sludge thickening, and sludge land application. The facility does not limit nitrate discharges from outfall 001; however, it does seasonally limit ammonia (PA DEP, 2004).

11.5 Nitrate Concentrations in the 2009 DMR Database

EPA reviewed the 2009 DMR nitrate as nitrogen pollutant discharges to determine the order of magnitude of the nitrate concentration discharges for meat and poultry facilities. EPA reviewed the nitrate concentrations from the 17 meat and poultry facilities that have 2009 DMR data, nine of which also report to the 2009 TRI database.

EPA compared the nitrate concentrations to the ambient surface water national MCL of 10 mg/L in source waters used for public drinking water supplies (U.S. EPA, 2002). In order to compare the nitrate concentrations, EPA determined that there were 286 nitrate concentrations in the 2009 DMR Loadings Tool. No nitrate concentrations were reported below the detection limit; therefore, EPA used all 286 concentrations for the analysis. Because facilities report multiple concentrations for each monitoring period, EPA prioritized the selection of the average concentration, then the maximum, and finally the minimum concentration. For facilities that reported nitrate quantity values, EPA back-calculated the concentrations using the quantity and the average monthly flow. Table 11-7 presents the minimum, maximum, and median nitrate concentration values evaluated in the 2009 DMR Loadings Tool.

Table 11-7. Minimum, Maximum, and Median Nitrate Concentrations in the 2009 DMR Loadings Tool

Minimum Nitrate Concentration (mg/L)	Maximum Nitrate Concentration (mg/L)	Median Nitrate Concentration (mg/L)
0	147	15.6

Source: DMR Loadings Tool.

Figure 11-1 presents the nitrate concentrations reported in the 2009 DMR Loadings Tool compared to the national MCL of 10 mg/L. As the figure shows, about 60 percent of the nitrate concentrations in the 2009 DMR Loading Tool are greater than the national MCL.

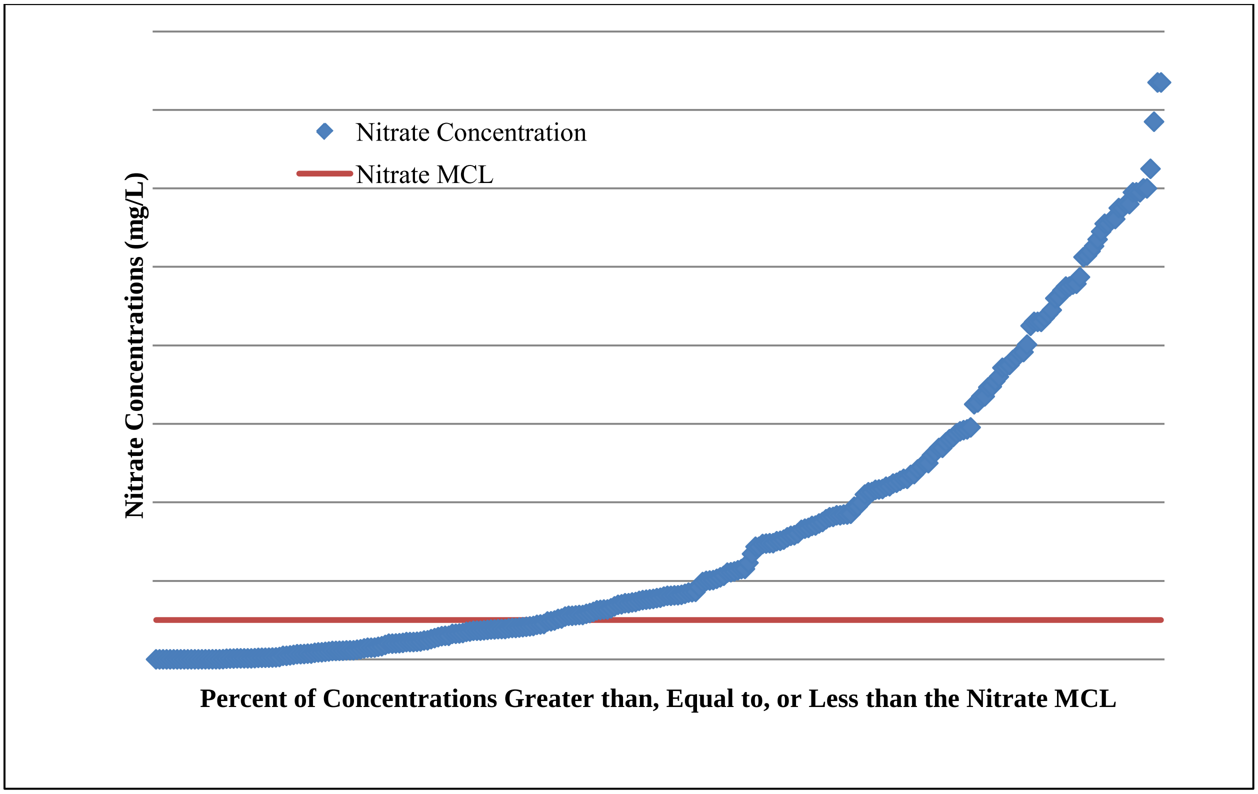

Figure 11-1. Meat and Poultry Nitrate Concentration Probability Plot

11.6 Meat and Poultry Category Conclusions

The majority of the estimated toxicity of the Meat and Poultry Category discharges results from nitrate compound discharges. Data collected for the 2011 Annual Reviews led EPA to conclude that, for the facilities that report nitrate discharges, the median nitrate concentration was 15.6 mg/L. EPA believes some facilities have not received updated permits reflective of effluent guidelines (Part 432). As a result, EPA will continue to review nitrate compound discharges from meat and poultry facilities during its 2012 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with “(5)” in the “Findings” column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

11.7 Meat and Poultry Category References

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2. NDEQ, 2004a. Nebraska Department of Environmental Quality. Fact Sheet for NPDES NE0123501 – Tyson Fresh Meats, Inc., Lexington, NE. (January 4). EPA-HQ-OW-2010-0824 DCN 07520.

3. NDEQ, 2004b. Nebraska Department of Environmental Quality. Facility Permit for NPDES NE0000795 – Cargill Meats Solutions Corporation, Schuyler, NE. (August 30). EPA-HQ-OW-2010-0824 DCN 07521.

4. NDEQ, 2005. Nebraska Department of Environmental Quality. Facility Permit for NPDES NE0032191 – Farmland Foods, Inc., Crete, NE. (March 1). EPA-HQ-OW-2010-0824 DCN 07522.

5. PA DEP, 2004. Pennsylvania Department of Environmental Protection. Facility Permit for NPDES PA0111759 – Cargill Meat Solutions Corporation, Wyalusing, PA (March 31). EPA-HQ-OW-2010-0824 DCN 07523.

6. U.S. Economic Census. 2007. 2007 Economic Census. Available online at: http://www.census.gov/econ/census07.

7. U.S. EPA, 2002. Development Document for the Proposed Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Industry Point Source Category. Washington, D.C. (January). EPA-821-B-01-007.

8. U.S. EPA. 2009. Technical Support Document for the Annual Review of Existing Effluent Guidelines and Identification of Potential New Point Source Categories. Washington, D.C. (October). EPA-821-R-09-007.

9. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-820-R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

10. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

12. METAL FINISHING (40 CFR PART 433)

EPA selected the Metal Finishing Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalents (TWPE), in the point source category rankings. This section summarizes the results of the 2011 Annual Reviews associated with the Metal Finishing Category. EPA focused on discharges of silver, polychlorinated biphenyls (PCBs), and cyanide, because of their high TWPE relative to the other pollutants in the Metal Finishing Category.

12.1 Metal Finishing Category Background

This subsection provides the background on the Metal Finishing Category, including a brief profile of the metal finishing industry and background on 40 CFR Part 433.

12.1.1 Metal Finishing Industry Profile

The Metal Finishing Category includes plants that engage in changing the surface of an object to improve its appearance and/or durability. It also includes direct discharging plants that engage in processes related to electroplating, which is the production of a thin surface coating of one metal on another by electrodeposition (U.S. EPA, 1983). The Metal Finishing Category includes 200 North American Industry Classification System (NAICS) codes (corresponding to 178 Standard Industrial Classification, or SIC, codes).

The sources of the discharge monitoring report (DMR) data used to develop *DMRLoads2009* report facilities by SIC code; the U.S. Economic Census and Toxics Release Inventory (TRI) report data by NAICS code. Accordingly, EPA reclassified the 2009 DMR data by the equivalent NAICS code. See Section 4.2.1.2 of the 2009 SLA Report for additional details (U.S. EPA, 2009). Table 12-1 lists the number of facilities from the 2007 U.S. Economic Census and the toxicity rankings databases for the 200 industrial categories with operations in the Metal Finishing Category. The U.S. Economic Census includes more facilities than the toxicity rankings databases for many reasons: facilities may not meet TRI-reporting thresholds, facilities may discharge to a publicly owned treatment works (POTW), and some facilities in the U.S. Economic Census are distributors or sales facilities, not manufacturers.

Table 12-1. Number of Metal Finishing Facilities

2007 U.S. Economic Census	2009 DMR			2009 TRI			
	Total	Minor	Major	Total	Indirect Dischargers Only	Direct Dischargers Only	Both Indirect and Direct Dischargers
166,356	858	749	109	1,970	1,382	323	265

Sources: U.S. Economic Census (2007), *TRIReleases2009_v2*, and *DMRLoads2009_v2*.

Table 12-1 also includes the number of metal finishing facilities by major or minor discharge status in the 2009 DMR database. As described in Section 2.1.5, permitting authorities classify discharges as major or minor based on the potential impact of the discharge. In general, major discharges are expected to impact receiving waters if not controlled; minor discharges may or may not. Also as described in Section 2.1.5, the PCS and ICIS-NPDES databases include data for a limited set of minor discharges (i.e., only those for which the state or other permitting authority chooses to include these data). Table 12-1 shows that approximately 82 percent of the Metal Finishing Category discharges in the 2009 DMR database are minor discharges. Table 12-1 also presents the type of discharges reported by facilities in the 2009 TRI database. The majority of the metal finishing facilities reporting to TRI reported indirect discharges to surface waters.

12.1.2 40 CFR Part 433

EPA first promulgated effluent limitations guidelines (ELGs) for the Metal Finishing Category (40 CFR Part 433) on September 15, 1983 (48 FR 41409). This category consists of one subcategory (Subpart A, "Metal Finishing Subcategory") that applies to the manufacture of products and product groups, as shown in Table 12-2 with corresponding applicability, regulated pollutants, and limitations. In addition to best practicable control technology (BPT), best available technology economically achievable (BAT), and new source performance standards (NSPS), the category includes pretreatment standards for existing sources (PSES) and pretreatment standards for new sources (PSNS) limitations.

Table 12-2. Applicability, Regulated Pollutants, and ELG Limits for the Metal Finishing Category

Subpart	Applicability	Pollutant	BAT/PSES Daily Max (Monthly Average) (mg/L)	NSPS/PSNS Daily Max (Monthly Average) (mg/L) [c]
Subpart A – Metal Finishing Subcategory	The provisions of this subpart apply to discharges from the following six metal finishing operations on any basis material: Electroplating, Electroless Plating, Anodizing, Coating (chromating, phosphating, and coloring), Chemical Etching and Milling, and Printed Circuit Board Manufacture. [a,b,c]	Silver	0.43 (0.24)	0.43 (0.24)
		Copper	3.38 (2.07)	3.38 (2.07)
		Lead	0.69 (0.43)	0.69 (0.43)
		Cyanide	1.20 (0.65)	1.20 (0.65)
		Cadmium	0.69 (0.26)	0.11 (0.07)
		Chromium	2.77 (1.71)	2.77 (1.71)
		Nickel	3.98 (2.38)	3.98 (2.38)
		Zinc	2.61 (1.48)	2.61 (1.48)
	For industrial facilities with cyanide treatment, and upon agreement between a source subject to those limits and the pollution control authority, the following amenable cyanide limit may apply in place of the total cyanide limit.	Cyanide amenable to alkaline chlorination	0.86 (0.32)	0.86 (0.32)

Source: 40 CFR §433.10.

[a] If any of those six operations are present, then this part applies to discharges from those operations and also to discharges from any of the following 40 process operations: cleaning, machining, grinding, polishing, tumbling, burnishing, impact deformation, pressure deformation, shearing, heat treating, thermal cutting, welding, brazing, soldering, flame spraying, sand blasting, other abrasive jet machining, electric discharge machining, electrochemical machining, electron beam machining, laser beam machining, plasma arc machining, ultrasonic machining, sintering, laminating, hot dip coating, sputtering, vapor plating, thermal infusion, salt bath descaling, solvent degreasing, paint stripping, painting, electrostatic painting, electropainting, vacuum metalizing, assembly, calibration, testing, and mechanical plating.

[b] In some cases, effluent limitations and standards for industrial categories may be effective and applicable to wastewater discharges from the metal finishing operations listed above. In such cases these part 433 limits shall not apply and the applicable industrial category regulations shall apply.

[c] This part does not apply to (1) metallic platemaking and gravure cylinder preparation conducted within or for printing and publishing facilities or (2) existing indirect discharging job shops and independent printed circuit board manufacturers which are covered by 40 CFR part 413.)

12.2 Metal Finishing Category 2011 Toxicity Rankings Analysis

Table 12-3 compares the toxicity rankings analysis results for the Metal Finishing Category from the 2009 through 2011 Annual Reviews. The combined DMR and TRI TWPE decreased from discharge years 2007 to 2009. The estimated 2009 DMR TWPE accounts for approximately 69 percent of the combined 2009 DMR and TRI TWPE.

Table 12-3. Metal Finishing Category TRI and DMR Discharges for the 2009 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	Metal Finishing Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2007[c]	2009	62,000	3,360,000	3,422,000
2008[c]	2010	74,400	463,000	537,400
2009	2011	86,100	197,000	283,100

Sources: *TRI Releases 2007 v2*, *DMRLoads2007_v4*, *TRIReleases2008_v3, DMRLoads2008_v3*; *TRIReleases2009_v2*; and *DMRLoads2009_v2*.

a Discharges include transfers to POTWs and account for POTW removals.

b DMR data from 2007 include only major dischargers. DMR 2008 data include both minor and major dischargers.

c EPA did not review discharges from the Metal Finishing Category as part of the 2009 and 2010 Annual Reviews because the category had recently undergone review and therefore could include data entry errors.

12.3 Metal Finishing Category Pollutants of Concern

EPA's review of the Metal Finishing Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 12-4 lists the five pollutants with the highest TWPE based on results from the 2011 Annual Reviews (*DMRLoads2009_v2*). The top three DMR-reported pollutants in 2009 contribute more than 76 percent of the category's 2009 DMR TWPE. As a result, EPA's review, presented in the following subsections, focused on the top three DMR database pollutants of concern: silver, cyanide, and PCB-1248. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they account for a minority (45 percent) of the 2009 Metal Finishing Category DMR TWPE.

Table 12-4. Metal Finishing Category Top DMR Pollutants

Pollutant	2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE
Silver	1	56	44,800
Cyanide	2	114	39,400
PCB-1248	3	2	24,200
Lead	4	123	17,300
Cadmium	5	65	16,900
Metal Finishing Category Total	**NA**	**360[b]**	**142,600**

Source: *DMRLoads2009_v2*.

a DMR data include major and minor dischargers.

b Number of facilities reporting a TWPE of greater than zero.

12.4 Metal Finishing Category Silver Discharges in DMR

Silver discharges from metal finishing facilities in the 2009 DMR database account for 23 percent of the category's 2009 DMR TWPE. Table 12-5 presents the facilities that account for the silver discharges in the 2009 DMR database. Discharges of silver from one facility, Eastman Kodak Company's Kodak Park Facility, account for over 91 percent of the category's silver DMR TWPE. Accordingly, EPA focused on this top facility.

Table 12-5. Metal Finishing Category Silver Dischargers in the 2009 DMR Database

Facility Name	Location	Silver Pounds Discharged	Silver TWPE	Facility Percent of Silver Category TWPE
Eastman Kodak Company, Kodak Park Facility	Rochester, NY	2,490	41,100	91.6%
Remaining Facilities Reporting Silver Discharges[a]		227	3,750	8.4%
Total		**2,720**	**44,800**	**100%**

Source: DMRLoads2009_v2.

a There are 55 remaining facilities that have silver discharges in the 2009 DMR database, which account for 8 percent of the category's silver DMR TWPE.

Eastman Kodak Park in Rochester, NY discharges silver via Outfall 001. Outfall 001 includes discharges of process wastewater (including water from associated activities) and stormwater to the Genesee River. Table 12-6 presents Eastman Kodak Park's 2009 monthly silver and flow discharge data in the DMR Loadings Tool for outfall 001. Table 12-6 also presents the back-calculated silver concentrations, calculated using the 2009 silver quantity and flow values.

Table 12-6. Eastman Kodak Park 2009 Monthly Silver and Flow Discharge Data for Outfall 001

Monitoring Period Date	DMR Loadings Tool Monthly Average Silver Discharge (kg/day)	DMR Loadings Tool Average Flow (MGD)	Back-Calculated Concentrations (mg/L)
31-Jan-09	2.45	17	0.04
28-Feb-09	1.45	18	0.02
31-Mar-09	5.90	17	0.09
30-Apr-09	7.26	17	0.11
31-May-09	4.04	16	0.07
30-Jun-09	4.54	15	0.08
31-Jul-09	1.90	15	0.03
31-Aug-09	1.72	18	0.03
30-Sep-09	1.09	14	0.02
31-Oct-09	2.59	14	0.05
30-Nov-09	2.95	15	0.05
31-Dec-09	1.27	16	0.02

Source: DMR Loadings Tool.

Eastman Kodak Park's permit limits silver discharge to 15.8 kg/day as a monthly average and 27.2 kg/day as a daily maximum (NY DEC, 2009). The Metal Finishing ELG silver limits are 0.24 mg/L monthly average and 0.43 mg/L daily maximum. The BAT treatment technology options used to develop the ELG basis for the concentration based silver limit are chemical precipitation and clarification at the final effluent (U.S. EPA, 1983). As shown in Table 12-6, the 2009 silver quantities do not exceed the mass-based permit limitations or concentration-based ELG limitations for silver. As part of the 2011 Annual Reviews, EPA also contacted the facility to confirm their 2009 flow data for outfall 001. Eastman Kodak Part confirmed that EPA was estimating the silver load with the correct flow for 2009 (Bishopp, 2011). Therefore, EPA determined that the silver discharges are likely accurate. As new data become available, EPA will continue to review flow and silver discharges for this facility.

12.5 Metal Finishing Category Cyanide Discharges in DMR

Cyanide discharges from metal finishing facilities in the 2009 DMR database account for 20 percent of the category's DMR TWPE. Table 12-7 presents the cyanide dischargers in the 2009 DMR database. Discharges of cyanide from one facility, Eastman Kodak Company's Windsor Facility (Eastman Windsor), account for 98 percent of the category's cyanide DMR TWPE. Accordingly, EPA focused its review of cyanide discharges on this top facility.

Table 12-7. Metal Finishing Category Cyanide Dischargers in the 2009 DMR Database

Facility Name	Location	Cyanide Pounds Discharged	Cyanide TWPE	Facility Percent of Cyanide Category TWPE
Eastman Kodak Company, Windsor Facility	Windsor, CO	34,600	38,400	98%
Remaining Facilities Reporting Cyanide Discharges[a]		844	937	2%
Total		**35,500**	**39,400**	**100%**

Source: DMRLoads2009_v2.

[a] There are 113 remaining facilities that have cyanide discharges in the 2009 DMR database, which account for 28 percent of the category's cyanide DMR TWPE.

Eastman Windsor in Windsor, CO discharges cyanide from outfall 001. Table 12-8 presents Eastman Windsor's 2008 and 2009 monthly cyanide and flow discharge data in the DMR Loadings Tool and Envirofacts for outfall 001. The reported monthly average cyanide concentrations for 2009 were 1,000 times higher than 2008 concentrations. Due to the difference in the order of magnitude of the cyanide concentrations from 2008 to 2009, EPA determined that a unit of measurement error had occurred for all monitoring periods in 2009. Using corrected cyanide concentration data, Eastman Windsor's cyanide discharges decrease to 37 pounds and 41 TWPE for 2009, reducing the facility's total TWPE by over 99 percent. This reduction in TWPE decreases the Metal Finishing Category's 2009 DMR TWPE by 38,392 TWPE, making cyanide no longer be a top pollutant of concern.

Table 12-8. Eastman Kodak Windsor 2008 and 2009 Monthly Cyanide and Flow Discharge Data for Outfall 001

Monitoring Period Date	DMR Loadings Tool Monthly Average Cyanide Concentration (mg/L)	Envirofacts Average Flow (MGD)
31-Jan-08	0	1.08
29-Feb-08	0	0.92
31-Mar-08	0.011	0.72
30-Apr-08	0.02	0.86
31-May-08	0.028	0.94
30-Jun-08	0	1.2
31-Jul-08	< 0.01	1.25
31-Aug-08	< 0.01	1.43
30-Sep-08	0.016	1.23
31-Oct-08	< 0.01	1.15
30-Nov-08	< 0.01	1.15
31-Dec-08	0.023	0.88
31-Jan-09	32	1.02
28-Feb-09	27	0.89
31-Mar-09	21.5	0.73
30-Apr-09	<10	0.89
31-May-09	6	0.96
30-Jun-09	5.5	0.89
31-Jul-09	< 10	1.12
31-Aug-09	6.5	1.2
30-Sep-09	7.5	1.01
31-Oct-09	9.5	0.87
30-Nov-09	11.5	0.84
31-Dec-09	9.5	1.12

Sources: DMR Loadings Tool and Envirofacts.

12.6 Metal Finishing Category PCB-1248 Discharges in DMR

PCB-1248 discharges in the 2009 DMR database account for 12 percent of the total DMR TWPE. Table 12-9 presents the two metal finishing PCB-1248 dischargers in the 2009 DMR database. Discharges of PCB-1248 from General Motors Powertrain’s Tonawanda Engine Plant account for over 95 percent of the category’s PCB-1248 DMR TWPE.

Table 12-9. Metal Finishing Category PCB-1248 Dischargers in the 2009 DMR Database

Facility Name	Location	PCB-1248 Pounds Discharged	PCB-1248 TWPE	Facility Percent of PCB-1248 Category TWPE
General Motors Powertrain – Tonawanda Engine Plant	Buffalo, NY	2.53	23,100	95%

Table 12-9. Metal Finishing Category PCB-1248 Dischargers in the 2009 DMR Database

Facility Name	Location	PCB-1248 Pounds Discharged	PCB-1248 TWPE	Facility Percent of PCB-1248 Category TWPE
General Motors Powertrain – Massena Plant	Massena, NY	0.12	1,100	5%
Total		**2.65**	**24,200**	**100%**

Source: DMRLoads2009_v2.

12.6.1 General Motors Powertrain, Tonawanda Engine Plant

The General Motors Powertrain (GM) Tonawanda Engine Plant in Buffalo, NY discharges PCB-1248 from outfall 001. Outfall 001 comprises non-contact cooling water, remediation system discharge, garage sump flow, and stormwater. The GM Tonawanda plant began operating in the 1950s. It consisted of three major operations: the engine plant, the forge facility, and the foundry complex. GM Tonawanda still operates an expanded engine plant today, but it sold the forge facility in 1994 and shut down the foundry complex in 1984. The foundry complex and accompanying buildings (wastewater treatment facilities) were demolished between 1996 and 1998. PCBs at the GM Tonawanda facility were historically used in the foundry and forge facilities. The remediation system discharge at this facility includes the removal of sand and concrete contaminated with PCBs. The demolition plan for the foundry complex included collection, treatment, and discharge of PCB-contaminated wastewaters that had been in contact with the foundry sand and concrete; handling and disposal of foundry sand; characterization and handling of PCB-contaminated concrete; and completion of the project by filling the basement with flowable fill (NY DEC, 2003b).

Table 12-10 presents GM Tonawanda’s 2009 monthly PCB-1248 concentrations and flow discharge data in the DMR Loadings Tool for outfall 001, with the permit-enforceable compliance level. GM Tonawanda’s 2009 PCB-1248 concentrations do not exceed the facility permit-enforceable compliance level. The 2009 flow for outfall 001 is also in compliance with the facility permit limits of 13.5 MGD monthly average and 25 MGD daily maximum. EPA determined that the data are likely accurate, and GM Tonawanda is likely discharging approximately 2.5 pounds of PCB-1248 from outfall 001 annually. However, the outfall contains remediation system discharge, which is not related to the manufacturing process but rather to cleanup of sand and concrete contaminated with PCBs from a foundry complex previously operated onsite.

Table 12-10. GM Tonawanda Outfall 001 2009 Monthly PCB-1248 Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool PCB-1248 Concentration (µg/L)	Facility Permit-Enforceable Compliance Level Limit (µg/L)	DMR Loadings Tool Average Flow (MGD)
31-Jan-09	0.095	0.3	2.84
28-Feb-09	0	0.3	7.10
31-Mar-09	0	0.3	5.34
30-Apr-09	0	0.3	5.84

Table 12-10. GM Tonawanda Outfall 001 2009 Monthly PCB-1248 Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool PCB-1248 Concentration (µg/L)	Facility Permit-Enforceable Compliance Level Limit (µg/L)	DMR Loadings Tool Average Flow (MGD)
31-May-09	0	0.3	5.14
30-Jun-09	0	0.3	4.05
31-Jul-09	0	0.3	8.09
31-Aug-09	0.19	0.3	9.16
30-Sep-09	0.098	0.3	8.73
31-Oct-09	0.09	0.3	9.43
30-Nov-09	0	0.3	7.84
31-Dec-09	0	0.3	7.68

Sources: DMR Loadings Tool and Facility Fact Permit (NY DEC, 2003a).

12.6.2 General Motors Powertrain – Massena Plant

General Motors Powertrain Massena Plant (GM Massena) in Massena, NY discharges PCB-1248 from three outfalls: 001, 003, and 005. Outfall 001 discharges process wastewater from aluminum casting production and sanitary wastewater, while outfalls 003 and 005 discharge noncontact cooling water, stormwater, and stormwater treatment discharge (NY DEC, 2010). The GM Massena plant was originally built in 1958 to produce aluminum cylinder heads. The plants used PCBs from 1959 to 1974 as a component of the hydraulic fluids in its die casting process. Since 1974, the GM Massena plant has continued manufacturing engine blocks without using the die casting process. In the early 1960s, a reclamation system was installed to recover used hydraulic fluid. PCB sludges were periodically landfilled in onsite areas (U.S. EPA Region 2, 2010). Stormwater and ground water from these landfills continues to be discharged but is not part of active manufacturing processes. Therefore, the PCB discharges are legacy discharges and the facility is no longer using or manufacturing PCBs onsite (U.S. EPA Region 2, 2010).

Table 12-11 presents GM Massena's 2009 monthly PCB-1248 concentrations and flow discharge data in the DMR Loadings Tool with the permit-enforceable compliance level. GM Massena's 2009 PCB-1248 average monthly concentrations for outfalls 001 and 003 were above the facility permit enforceable compliance level in July 2009, while outfall 005 PCB-1248 2009 concentrations were below the limit for all of 2009. EPA calculated the associated TWPE with these exceedances using the monthly average concentrations and the daily maximum permit limit. EPA determined that the amount of TWPE associated with the July 2009 exceedances is approximately 200 TWPE. This facility appears to be exceeding its concentration-based permit PCB-1248 concentration for outfalls 001 and 003 for the July reporting period in 2009.

Table 12-11 GM Massena 2009 Monthly PCB-1248 Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool PCB-1248 Average Monthly Concentration (µg/L)	Facility Permit-Enforceable Compliance Level Limit (µg/L)	DMR Loadings Tool Average Flow (MGD)
Outfall 001			
31-Jan-09	0	0.3	0.138
28-Feb-09	0.1	0.3	0.147
31-Mar-09	0.1	0.3	0.166
30-Apr-09	0.019	0.3	0.145
31-May-09	0	0.3	0.074
30-Jun-09	0	0.3	0.142
31-Jul-09	0.56	0.3	0.102
31-Aug-09	NODI C	0.3	NODI C
30-Sep-09	<0.051	0.3	0.185
31-Oct-09	<0.05	0.3	0.082
30-Nov-09	<0.05	0.3	0.105
31-Dec-09	NODI C	0.3	NODI C
Outfall 003			
31-Jan-09	0	0.3	0.084
28-Feb-09	0.3	0.3	0.212
31-Mar-09	0	0.3	0.190
30-Apr-09	0.06	0.3	0.158
31-May-09	0.07	0.3	0.192
30-Jun-09	0.13	0.3	0.092
31-Jul-09	0.79	0.3	0.202
31-Aug-09	NODI C	0.3	NODI C
30-Sep-09	<0.051	0.3	0.434
31-Oct-09	<0.05	0.3	0.266
30-Nov-09	<0.05	0.3	0.230
31-Dec-09	<0.05	0.3	0.376

Table 12-11 GM Massena 2009 Monthly PCB-1248 Discharge and Flow Data

Monitoring Period Date	DMR Loadings Tool PCB-1248 Average Monthly Concentration (µg/L)	Facility Permit-Enforceable Compliance Level Limit (µg/L)	DMR Loadings Tool Average Flow (MGD)
Outfall 005			
31-Jan-09	0	0.3	0.040
28-Feb-09	0	0.3	0.038
31-Mar-09	0	0.3	0.254
30-Apr-09	0	0.3	0.144
31-May-09	0	0.3	0.029
30-Jun-09	NODI C	0.3	NODI C
31-Jul-09	0.1	0.3	0.332
31-Aug-09	0.09	0.3	0.365
30-Sep-09	NODI C	0.3	NODI C
31-Oct-09	<0.05	0.3	0.301
30-Nov-09	NODI C	0.3	NODI C
31-Dec-09	<0.05	0.3	0.294

Sources: DMR Loadings Tool and Facility Fact Permit (NY DEC, 2010).

NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

12.7 Metal Finishing Category Conclusions

The estimated toxicity of the Metal Finishing Category discharges resulted from silver, cyanide, and PCB-1248 discharges. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- Eastman Kodak Park's 2009 silver quantities and concentrations did not exceed mass-based permit limits or the concentration-based ELG limits for the Metal Finishing Category. Therefore, EPA determined that the silver discharges are likely accurate. As future data becomes available, EPA will continue to review flow and silver discharges for this facility.

- There are database errors for discharges of cyanide from Eastman Windsor. With these errors corrected, the Metal Finishing Category's cyanide TWPE decreases by over 97 percent, from 39,370 TWPE to 978 TWPE.

- GM Tonawanda and GM Massena facilities are discharging PCBs. The PCB discharges result from remediation systems and landfills, not metal manufacturing processes. The GM Tonawanda facility is not exceeding its concentration-based permit limits for PCB-1248. However, the GM Massena facility is exceeding the concentration-based permit PCB-1248 limit, specifically during the reporting period for July 2009. Permit limit exceedances do not warrant the need for further regulation, but they do call for better facility compliance. EPA will continue to review PCB discharges from the GM facilities.

- The amount of TWPE corresponding to the July 2009 exceedances for the GM Massena facility is 220 TWPE. In addition, the PCB discharges are not related to manufacturing processes regulated by the Metal Finishing. Therefore, these discharges do not indicate a need to consider revision of existing ELGs.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 Metal Finishing Category TWPE from 196,502 TWPE to 158,110 TWPE. The Metal Finishing Category continues to rank high due to the high number of facilities (over 1,900) in the industry. EPA will continue to review the Metal Finishing Category discharges to determine if they are properly controlled.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with “(3)” in the “Findings” column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

12.8 Metal Finishing Category References

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4. NY DEC. 2009. New York State Department of Environmental Conservation. *NPDES Permit: Eastman Kodak Company, Rochester, NY*. EPA-HQ-OW-2010-0824. DCN 07537.

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6. U.S. Economic Census. 2007. Available online at: http://www.census.gov/econ/census07.

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9. U.S. EPA Region 2. 2010. *General Motors (Central Foundry Division).* New York (October 5). EPA-HQ-OW-2010-0824. DCN 07541.

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13. MINERAL MINING AND PROCESSING (40 CFR PART 436)

EPA selected the Mineral Mining and Processing (Mineral Mining) Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. This industry was reviewed previously in EPA's Final 2004 and 2010 Effluent Guidelines Program Plans (U.S. EPA, 2004, 2011). This section summarizes the results of the 2011 Annual Reviews, which focused on discharges of cadmium, fluoride, and chlorine, due to their high TWPE relative to the other pollutants in the Mineral Mining Category and the 2010 Annual Reviews findings.

13.1 Mineral Mining Category 2011 Toxicity Rankings Analysis

Table 13-1 compares the toxicity rankings analysis results for the Mineral Mining Category from the 2006 through 2011 Annual Reviews. The combined discharge monitoring report (DMR) and Toxics Release Inventory (TRI) TWPE decreased from discharge years 2004 to 2007, increased from discharge years 2007 to 2008, and decreased again from 2008 to 2009. The estimated 2009 DMR TWPE accounts for over 93 percent of the combined 2009 DMR and TRI TWPE, similar to previous years of data.

Table 13-1. Mineral Mining Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analyses

		Mineral Mining Category		
Year of Discharge	Year of Review	TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	2,840	50,500	53,300
2004	2007	5,390	49,300	54,700
2005	2008	6,260	NA	NA
2007	2009	2,420	26,700	29,100
2008	2010	3,390	100,000	103,000
2009	2011	5,430	80,100	85,500

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

a Discharges include transfers to POTWs and account for POTW removals.

b DMR data from 2007 include only major dischargers. DMR 2008 and 2009 data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

13.2 Mineral Mining Category Pollutants of Concern

EPA's review of the Mineral Mining Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 13-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3*, respectively). The top five DMR-reported pollutants in 2009 contribute more than 87 percent of the total category TWPE.

Table 13-2. Mineral Mining Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Cadmium	Pollutants not reported in the top five 2008 DMR-reported pollutants.			1	6	17,600
Fluoride	2	20	28,200	2	22	15,800
Chlorine	Pollutants not reported in the top five 2008 DMR-reported pollutants.			3	13	15,000
Lead	5	12	5,940	4	12	13,200
Chloride	4	27	6,690	5	23	8,310
Sulfide	1	5	35,900	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
Ammonia as N	3	28	11,100			
Mineral Mining Category Total	**NA**	**120[b]**	**100,000**	**NA**	**139[b]**	**80,100**

Sources: *DMRLoads2008_v2* and *DMRLoads2009_v2*.

a DMR data include major and minor dischargers.

b Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

EPA's additional review of the Mineral Mining Category's 2009 DMR database pollutants of concern focused on cadmium, fluoride, and chlorine, presented in the following subsections. EPA continued its review of fluoride based on findings from the 2010 Annual Reviews. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because they account for a small percentage (27 percent) of the 2009 DMR TWPE for the Mineral Mining Category.

Of the pollutants of concern for the Mineral Mining Category, 40 CFR Part 436 only regulates fluoride in the Industrial Sand Subcategory (Subpart D). The majority of fluoride discharges in this category are from facilities covered by the Phosphate Rock Subcategory (Subpart R), which does not regulate fluoride (U.S. EPA, 2011).

13.3 Mineral Mining Category Cadmium Discharges in DMR

Cadmium discharges in the 2009 DMR database account for 22 percent of the total DMR TWPETable 13-3 presents the cadmium dischargers in the 2009 DMR database. Discharges of cadmium from two facilities, Butala Sand and Gravel and Doe Run Buick Mine/Mill, account for over 99 percent of the category's cadmium DMR TWPE. Accordingly, EPA focused its review of cadmium discharges on these top two facilities.

Table 13-3. Mineral Mining Category Cadmium Dischargers in the 2009 DMR Database

Facility Name	Location	Cadmium Pounds Discharged	Cadmium TWPE	Facility Percent of Cadmium Category TWPE
Butala Sand and Gravel	Salida, CO	466	10,800	61%
Doe Run Buick Mine/Mill[a]	Viburnum, MO	291	6,720	38%
Remaining facilities reporting cadmium discharges[b]		4.1	93	< 1%
Total		**762**	**17,600**	**100%**

Source: DMRLoads2009_v2.

[a] Due to an EPA enforcement settlement, Doe Run is required to lower cadmium discharges at all Doe Run facilities in Missouri (including the Buick Mine/Mill). Because the settlement includes Doe Run's cadmium discharges, EPA will not review the facility's discharges as part of the 2011 Annual Reviews (U.S. EPA, 2010).

[b] There are four remaining facilities that have cadmium discharges in the 2009 DMR database, which account for 0.5 percent of the category's cadmium DMR TWPE.

13.3.1 Butala Sand and Gravel

Butala Sand and Gravel (Butala) in Salida, CO discharges cadmium from outfall 002. Table 13-4 presents Butala's 2009 quarterly cadmium and flow discharge data in the DMR Loadings Tool for outfall 002. After reviewing the flow data from the DMR Loadings Tool, EPA determined that the December 2009 flow is 1,000 times higher than the flow in preceding periods. Using a corrected value of 0.434 million gallons per day (MGD) for the December 2009 outfall 002 flow, Butala's cadmium discharges are 0.92 pounds and 21.27 TWPE for 2009, reducing the facility's total TWPE by over 99 percent. This reduction decreases the Mineral Mining Category's 2009 DMR TWPE by 11,000, making cadmium no longer be a top pollutant of concern.

Table 13-4. Butala 2009 Monthly Cadmium and Flow Discharge Data for Outfall 002

Monitoring Period Date	DMR Loadings Tool Average Cadmium Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)	Corrected Average Flow (MGD)
31-Mar-09	NODI C	NODI C	NODI C
30-Jun-09	0.0011	0.15	0.15
30-Sep-09	< 0.00062	0.439	0.439
31-Dec-09	0.0014	434	0.434

Source: DMR Loadings Tool.

NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

13.4 Mineral Mining Category Fluoride Discharges in DMR

Fluoride discharges in the 2009 DMR database account for 20 percent of the total DMR TWPE. Table 13-5 presents the fluoride dischargers in the 2009 DMR database. EPA focused its review of fluoride discharges on the top five facilities, which account for over 71 percent of the category's fluoride 2009 DMR TWPE.

Table 13-5. Mineral Mining Category Fluoride Dischargers in the 2009 DMR Database

Facility Name	Location	Fluoride Pounds Discharged	Fluoride TWPE	Facility Percent of Fluoride Category TWPE
Mosaic Fertilizer, LLC, Ft. Green Mine Complex	Fort Green, FL	130,000	3,900	25%
US Agri-Chemicals, Ft. Meade	Fort Meade, FL	125,000	3,760	24%
Mosaic Fertilizer, LLC, Four Corners Mine	Polk County, FL	48,200	1,450	9%
Feldspar Corp. Spruce Pine Facility	Spruce Pine, NC	37,000	1,110	7%
South Fort Meade Mine	Nichols, FL	36,900	1,110	7%
Remaining facilities reporting fluoride discharges[a]		149,000	4,470	28%
Total		**526,000**	**15,800**	**100%**

Source: DMRLoads2009_v2.

[a] There are 17 remaining facilities that have fluoride discharges in the 2009 DMR database, which account for 28 percent of the category's cadmium DMR TWPE.

The majority of the fluoride discharges for the Mineral Mining Category come from phosphate mines in Florida and feldspar mines in North Carolina. These fluoride discharges result from mineral mining processes that are regulated by Subparts R (Phosphate Rock) and AI (Feldspar). Neither Subpart R nor Subpart AI sets limits for fluoride (Subpart AI is reserved). EPA previously compiled information on this category from the *1976 Development Document for Interim Final Effluent Limitations Guidelines and Standards of Performance—Mineral Mining and Processing Industry*. A summary of EPA's review is found in Section 9.5.1 of the 2010 Technical Support Document (U.S. EPA, 2011).

The top five fluoride discharging facilities account for the majority (71 percent) of fluoride discharges in 2009. This subsection provides information on each facility's fluoride discharges from the 2009 DMR Loadings Tool and their corresponding permit limits, if available.

13.4.1 US Agri-Chemicals Corporation

US Agri-Chemicals Corporation (US Agri-Chemicals) in Fort Meade, FL manufactures sulfuric acid, phosphoric acid, mono-ammonium phosphate, di-ammonium phosphate, and fluosilicic acid. US Agri-Chemicals also has a lined phosphogypsum stack and an unlined process water cooling pond with a recirculation system. As of 2004, the facility was working with the state to close the unlined pond. The facility's 2004 NPDES permit also allows the facility to construct an additional lined phosphogypsum stack. The facility treats wastewater from both ponds through a two-stage lime treatment and spray aeration process before discharge (FL DEP, 2004).

Based on the facility's permit and fact sheet, EPA believes that the facility's operations fall within the applicability of the Fertilizer Manufacturing Effluent Limitations Guidelines, or ELGs (40 CFR Part 418) rather than the Mineral Mining ELGs (40 CFR Part 436) because the facility does not have any mining operations. Therefore, discharges from this facility should be excluded from the 2011 Annual Reviews of the Mineral Mining Category, reducing the category's TWPE by 3,760.

13.4.2 Feldspar Corporation Spruce Pine Facility

The Feldspar Corporation (Feldspar) in Spruce Pine, NC is an industrial minerals processing facility. The facility produces feldspar, quartz, and mica. Outfall 001 discharges treated process wastewater to the North Toe River. The facility's treatment system includes clarifiers, a polymer feed system, lime for pH adjustment, vacuum filters, and an Emico clarifier/thickener to outfall 001 (NCDENR, 2006).

The facility discharges fluoride from outfall 001. Previously, the facility treated discharges from Unimin Corporation's Crystal Operation, and the fluoride permit limits for the facility were 102 kilograms per day (kg/day) monthly average and 203 kg/day daily maximum. However, once Unimin began directly discharging, Feldspar's fluoride limits were revised to 78.9 kg/day monthly average and 157 kg/day daily maximum (NCDENR, 2006). The North Carolina Division of Water Quality permit writer for this facility confirmed that Unimin Corporation did not start directly discharging to the North Toe River until 2010 (Nowell, 2011); therefore, the higher limits applied to the 2009 fluoride discharges. As presented in Table 13-6, the 2009 average monthly quantities for outfall 001 did not exceed the monthly or maximum mass-based permit limitation. The facility also has a monthly average flow permit limit of 3.5 MGD for outfall 001. As presented in Table 13-6, the 2009 monthly average flows do not exceed 3.5 MGD.

EPA back-calculated the average and maximum 2009 fluoride concentrations, presented in Table 13-6, using the quantity and flow. The average and maximum calculated concentrations exceed the freshwater aquatic life water quality standard of 1.8 milligrams per liter, or mg/L (U.S. EPA, 2007). However, the facility's permit writer stated that the North Toe River's total fluoride allocation had been calculated using the water quality standard and the river's lowest seven-day average flow that occurs (on average) once every 10 years. The permit writer then divided the total fluoride allocation between the five feldspar mines along the North Toe River based on facility design capacity to determine the mass-based permit limits. The permit writer also stated that the North Carolina Division of Water Quality monitors fluoride concentrations using ambient monitoring stations to confirm that fluoride levels in the North Toe River are below 1.8 mg/L. The permit writer confirmed that the fluoride levels did not exceed 1.8 mg/L.

Because the 2009 average fluoride quantities are below the permit limit, EPA determined that the fluoride discharges and flows are likely accurate, and the Feldspar Corporation in Spruce Pine, NC is likely discharging more than 37,000 pounds of fluoride annually. These feldspar mine fluoride discharges are geographically isolated to North Carolina, and permit writers have enacted permit limits to ensure that fluoride levels do not exceed the water-quality-based permit limits. As a result, these discharges are being controlled and do not indicate the need for a national ELG. EPA will continue to review fluoride discharges from feldspar mines in North Carolina.

Table 13-6. Feldspar 2009 Monthly Fluoride and Flow Discharge Data for Outfall 002

Monitoring Period Date	DMR Loadings Tool Average 2009 Fluoride Quantity (kg/day)	DMR Loadings Tool Maximum 2009 Fluoride Quantity (kg/day)	Back-Calculated Average Fluoride Concentration (mg/L)	Back-Calculated Maximum Fluoride Concentration (mg/L)	DMR Loadings Tool Average 2009 Flow (MGD)
31-Jan-09	35.7	194	4.10	22.3	2.3
28-Feb-09	50.9	140	5.87	16.2	2.29
31-Mar-09	33.7	101	4.95	14.9	1.80
30-Apr-09	34.9	125	5.71	20.5	1.61
31-May-09	26.9	92.5	4.64	16.0	1.53
30-Jun-09	59.1	123	8.78	18.3	1.78
31-Jul-09	31.9	156	5.22	25.6	1.61
31-Aug-09	59.7	125	7.79	16.3	2.02
30-Sep-09	64.8	155	7.75	18.5	2.21
31-Oct-09	55.5	124	6.48	14.4	2.26
30-Nov-09	49.9	167	5.93	19.9	2.22
31-Dec-09	50.3	112	5.65	12.6	2.35

Source: DMR Loadings Tool.

13.5 Florida Fluoride Dischargers

Three of the top five fluoride dischargers are phosphate mines in Florida. The fluoride permit limits for all the Florida discharges is 10.0 mg/L. The fluoride permit limits of 10 mg/L are based on Table 62-302.230, “Surface Water Quality Criteria,” in the Florida Administrative Code (FL DEP, 2000, 2003a, 2003b). The Florida Department of Environmental Protection (FL DEP) Mining and Minerals Phosphate Management contact stated that the usual fluoride concentration from the phosphate mines in Florida is approximately 3 mg/L; therefore, there has been no action to revise the state’s fluoride water quality criteria or research new treatment technologies for fluoride discharges. The FL DEP contact also stated that it is difficult to estimate the actual discharge area of these mines because the acreage and outfalls change constantly with mining operations (Champion, 2011). A summary of each top fluoride discharger in Florida is provided below.

13.5.1 Mosaic Fertilizer, LLC, Fort Green Mine Complex

The Mosaic Fertilizer, LLC, Fort Green and Payne Creek Mines (Fort Green Mine Complex) in Fort Green, FL discharges fluoride from six outfalls: 001, 002, 003, 004, 005, and 006. The Fort Green Mine Complex operations include phosphate mining and beneficiation facilities, phosphatic clay settling areas, sand tailings disposal areas, and a mine water recirculation system. The mine water recirculation system discharges treated excess process wastewater, stormwater runoff, and reclaimed wastewater from the outfalls listed above. At this facility, phosphate ore is strip-mined by dragline, then slurried in a pit with high-pressure water cannons and pumped to the beneficiation plant, where the fine clays and sands are separated from the product phosphate rock. This separation is achieved by washing, screening, and double flotation. The separated clays are pumped to waste clay settling areas. Sand tailings are pumped as slurry to mined areas for use as reclamation fill. Decanted water from the clay settling areas is returned to the beneficiation plant and discharged as necessary (FL DEP, 2003a).

The facility's wastewater treatment facilities include settling basins where mine dewatering and process-generated wastewater from the phosphate mining and beneficiation (offsite) operations and stormwater runoff are sent. The discharge consists of clarified water from the water recirculation system. All process wastewater to be discharged first passes through active settling areas, where contaminants are retained with the settled clays (FL DEP, 2003a).

Table 13-7 presents the 2009 quarterly fluoride and flow discharge data from the DMR Loadings Tool, along with the daily maximum fluoride permit limit and the average design flow reported in the facility permit fact sheet (FL DEP, 2003a). The 2009 daily maximum fluoride concentrations did not exceed the daily maximum permit limitation of 10 mg/L. The flows reported for each outfall vary compared to the facility permit fact sheet flows; however, discharges are dependent on the rainfall contributions to the system in excess of the available storage capacity and the inflow of ground water into mining cuts (FL DEP, 2003a).

Because the quarterly fluoride concentrations do not exceed permit limits, EPA determined that the fluoride discharges and flows are likely accurate, and the Fort Green Mine Complex is likely discharging more than 128,000 pounds of fluoride annually.

Table 13-7. Fort Green Mine Complex 2009 Fluoride and Flow Discharge Data

Outfall	Monitoring Period Date	DMR Loadings Tool Daily Maximum Fluoride Concentration (mg/L)	Daily Maximum Fluoride Permit Limit (mg/L)	DMR Loadings Tool Monthly Flow (MGD)	Facility Fact Sheet Average Flow (MGD)
001	31-Mar-09	NODI C	10.0	NODI C	0.207
001	30-Jun-09	NODI C	10.0	NODI C	
001	30-Sept-09	0.98	10.0	NODI C	
001	31-Dec-09	NODI C	10.0	NODI C	
002	31-Mar-09	NODI C	10.0	NODI C	4.273
002	30-Jun-09	1.69	10.0	9.19	
002	30-Sept-09	1.12	10.0	25.6	
002	31-Dec-09	0.76	10.0	12.17	
003	31-Mar-09	NODI C	10.0	NODI C	0
003	30-Jun-09	1	10.0	31.38	

Table 13-7. Fort Green Mine Complex 2009 Fluoride and Flow Discharge Data

Outfall	Monitoring Period Date	DMR Loadings Tool Daily Maximum Fluoride Concentration (mg/L)	Daily Maximum Fluoride Permit Limit (mg/L)	DMR Loadings Tool Monthly Flow (MGD)	Facility Fact Sheet Average Flow (MGD)
003	30-Sept-09	NODI C	10.0	NODI C	
003	31-Dec-09	NODI C	10.0	NODI C	
004	31-Mar-09	0.67	10.0	NODI C	0
004	30-Jun-09	0.62	10.0	25.43	
004	30-Sept-09	0.69	10.0	35.3	
004	31-Dec-09	0.78	10.0	37.67	
005	31-Mar-09	1.27	10.0	NODI C	24.89
005	30-Jun-09	1.26	10.0	10.01	
005	30-Sept-09	1.18	10.0	49	
005	31-Dec-09	0.97	10.0	18.85	
006	31-Mar-09	1.02	10.0	NODI C	0
006	30-Jun-09	NODI C	10.0	NODI C	
006	30-Sept-09	0.73	10.0	1.02	
006	31-Dec-09	0.66	10.0	0.96	

Sources: DMR Loadings Tool and facility permit fact sheet (FL DEP, 2003a).
NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

13.5.2 Mosaic Fertilizer, LLC, Four Corners Mine

The Mosaic Fertilizer, LLC Four Corners Mine (Four Corners Mine) in Polk County, FL discharges fluoride from outfalls 001 and 002. The Four Corners Mine operations include phosphate mining and beneficiation facilities, phosphatic clay settling areas, sand tailings disposal areas, and a mine water recirculation system. The mine water recirculation system discharges treated excess process wastewater, non-process wastewater, groundwater seepage, and stormwater runoff from the outfalls listed above. Facility activities include the mining of phosphate ore. The mined ore is slurried into a pit and then pumped to the beneficiation plant, where the fine clays and sands are separated from the phosphate rock by washing, screening, and double flotation. The generated wet phosphate rock is transferred to another location for further processing. The separated clays are pumped to waste clay settling areas. Sand tailings are pumped as a slurry to mined areas for use as reclamation fill. Decanted waters from the clay settling areas, ground waters from mine pits, and stormwater runoff are returned to the beneficiation plant for reuse, and excess water is discharged as necessary (FL DEP, 2003b).

The facility's wastewater treatment facilities include settling basins where mine dewatering and process generated wastewater from the phosphate mining and beneficiation operations and stormwater runoff are sent. The discharge consists of clarified water from the water recirculation system. All process wastewater to be discharged first passes through active settling areas, where contaminants are retained with the settled clays (FL DEP, 2003b).

Table 13-8 presents the 2009 monthly discharge data for fluoride and flow from the DMR Loadings Tool. Table 13-8 also presents the daily maximum fluoride permit limit (FL DEP, 2003a). The DMR Loadings Tool 2009 monthly average fluoride concentrations data for these outfalls did not exceed the daily maximum permit limitation of 10 mg/L.

Table 13-8. Four Corners Mine 2009 Fluoride and Flow Discharge Data

Outfall	Monitoring Period Date	DMR Loadings Tool Daily Maximum Fluoride Concentration (mg/L)	Daily Maximum Fluoride Permit Limit (mg/L)	DMR Loadings Tool Monthly Flow (MGD)
001	31-Jan-09	NODI 9	10.0	NODI C
001	28-Feb-09	NODI 9	10.0	NODI C
001	31-Mar-09	NODI 9	10.0	NODI C
001	30-Apr-09	NODI 9	10.0	NODI C
001	31-May-09	NODI 9	10.0	18.4
001	30-Jun-09	1.5	10.0	60.5
001	31-Jul-09	NODI 9	10.0	55.5
001	31-Aug-09	NODI 9	10.0	52
001	30-Sep-09	2	10.0	50.8
001	31-Oct-09	NODI 9	10.0	1.52
001	30-Nov-09	NODI C	10.0	NODI C
001	31-Dec-09	NODI C	10.0	NODI C
002	31-Jan-09	NODI 9	10.0	NODI C
002	28-Feb-09	NODI 9	10.0	NODI C
002	31-Mar-09	NODI 9	10.0	NODI C
002	30-Apr-09	NODI 9	10.0	NODI C
002	31-May-09	NODI 9	10.0	13
002	30-Jun-09	1.6	10.0	43
002	31-Jul-09	NODI 9	10.0	30
002	31-Aug-09	NODI 9	10.0	4.7
002	30-Sep-09	1.8	10.0	11.6
002	31-Oct-09	NODI C	10.0	NODI C
002	30-Nov-09	NODI C	10.0	NODI C
002	31-Dec-09	2.2	10.0	30

Sources: DMR Loadings Tool and facility permit fact sheet (FL DEP, 2003b).
NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.
NODI 9: The facility did not report a concentration because of conditional monitoring.

Table 13-9 presents the average annualized flow from each of the outfalls 001 and 002 during 2009. The total flow through these outfalls is higher than the discharges described by the facility in the 2003 permit fact sheet (total flow in 2002); however, discharges are dependent on the rainfall contributions to the system in excess of the available storage capacity and the inflow of ground water into mining cuts (FL DEP, 2003b).

Because the quarterly fluoride concentrations do not exceed permit limits, EPA determined that the fluoride discharges and flows are likely accurate, and the Four Corners Mine is likely discharging more than 48,000 pounds of fluoride annually from outfalls 001 and 002 combined.

Table 13-9. Four Corners Mine 2009 Flow Discharge Data

Outfall	DMR Loadings Tool Average Flow (MG/year)	Permit Fact Sheet Flow in 2002 (MG/year)
001	14,522	3,185
002	8,048	1,183

Sources: DMR Loadings Tool and facility permit fact sheet (FL DEP, 2003b).

13.5.3 South Fort Meade Mine

South Fort Meade Mine in Nichols, FL discharges wastewater and stormwater from its outfall 001. South Fort Meade Mine operations include phosphate mining and beneficiation facilities, phosphatic clay settling areas, sand tailings disposal areas, and a mine water recirculation system. Facility activities include the mining and washing of phosphate ore. The mined ore is slurried into a pit and pumped to the beneficiation plant where the fine clays and sand are separated from the phosphate rock by washing, screening, and double flotation. The generated wet phosphate rock is transported to another location for further processing. The separated clays are pumped to settling areas. Sand tailings are pumped as a slurry to mined areas for use as reclamation fill or are stored above grade for later use in reclamation. Decanted waters from the clay settling areas, ground waters from mine pits, and stormwater runoff are returned to the beneficiation plant for reuse, and excess water is discharged as necessary (FL DEP, 2000).

Table 13-10 presents the quarterly 2009 average fluoride concentration and flow data for outfall 001 in the DMR Loadings Tool. South Fort Meade Mine did not exceed the daily maximum permit limitation of 10.0 mg/L. The facility does not have a limitation on total flow. Table 13-10 below presents the DMR Loadings Tool 2009 monthly average total flow data for outfall 001.

Because the quarterly fluoride concentrations do not exceed permit limits, EPA determined that the fluoride discharges and flows are likely accurate, and the South Fort Meade Mine is likely discharging more than 36,000 pounds of fluoride annually from outfall 001.

Table 13-10. South Fort Meade Mine 2009 Monthly Fluoride and Flow Discharge Data for Outfall 001

Monitoring Period Date	DMR Loadings Tool Maximum Fluoride Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Mar-09	NODI C	NODI C
30-Jun-09	1.9	1.23
30-Sep-09	1.25	22.63
31-Dec-09	1.57	12.59

Source: DMR Loadings Tool.
NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

13.5.4 Fluoride Wastewater Treatment

EPA determined that the top fluoride discharging facilities have two-stage chemical precipitation with lime treatment systems. This process is similar to that at phosphatic fertilizer manufacturing facilities, which achieve fluoride concentrations of 15 mg/L or less (U.S. EPA, 1974). Current technologies are achieving fluoride concentrations at least as effective, sometimes achieving 2 mg/L effluent fluoride. Using calcium chloride rather than lime has improved chemical precipitation, while using polymers and membrane filters has improved solids separation (WC&E, 2006; Ionics, n.d.; GCIP, 2002).

13.6 Mineral Mining Category Chlorine Discharges in DMR

Chlorine discharges in the 2009 DMR database account for 19 percent of the total DMR TWPE. Table 13-11 lists the facilities discharging chlorine in the 2009 DMR database. Discharges of chlorine from one facility, Carmeuse Lime and Stone, Inc., account for over 94 percent of the category's chlorine DMR TWPE. As a result, EPA focused its review of cadmium discharges on that facility.

Table 13-11. Mineral Mining Category Chlorine Dischargers in the 2009 DMR Database

Facility Name	Location	Chlorine Pounds Discharged	Chlorine TWPE	Facility Percent of Chlorine Category TWPE
Carmeuse Lime & Stone, Inc.	Butler, KY	28,400	14,200	94%
Remaining facilities reporting Chlorine discharges[a]		1,670	836	6%
Total		**30,000**	**15,000**	**100%**

Source: DMRLoads2009_v2.

a – There are 12 remaining facilities that have chlorine discharges in the 2009 DMR database, which account for 6 percent of the category's cadmium DMR TWPE.

Carmeuse Lime and Stone, Inc. (Carmeuse) in Butler, KY discharges chlorine from outfall 015. Table 13-12 presents Carmeuse's 2009 monthly chlorine and flow discharge data in the DMR Loadings Tool for outfall 015. In reviewing the flow data from the DMR Loadings Tool, EPA found a unit of measurement error for the February 2009 flow, the reported flow for this month was 1,000 times higher than for other months in 2009, as presented in Table 13-12. Using a corrected value of 0.0011 MGD for the February 2009 outfall 015 flow, Carmeuse's chlorine discharges are 81 pounds and 40.42 TWPE for 2009, reducing the facility's total TWPE by over 99 percent. This reduction in TWPE decreases the Mineral Mining Category's 2009 DMR TWPE to 40.42, making chlorine no longer a top pollutant of concern.

Table 13-12. Carmeuse 2009 Monthly Chlorine and Flow Discharge Data for Outfall 015

Monitoring Period Date	DMR Loadings Tool Maximum Chlorine Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)	Corrected Average Flow (MGD)
31-Jan-09	0.7	0.004	0.004
28-Feb-09	11	11	0.0011
31-Mar-09	5.5	0.0029	0.0029
31-Jul-09	1.1	0.0031	0.0031
30-Sep-09	0.7	0.0029	0.0029
31-Oct-09	0.5	0.0058	0.0058
30-Nov-09	75.5	0.0035	0.0035

Table 13-12. Carmeuse 2009 Monthly Chlorine and Flow Discharge Data for Outfall 015

Monitoring Period Date	DMR Loadings Tool Maximum Chlorine Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)	Corrected Average Flow (MGD)
31-Dec-09	4.86	0.004	0.004

Source: DMR Loadings Tool.

13.7 Mineral Mining Category Conclusions

Based on available data, the estimated toxicity of the Mineral Mining Category discharges in the toxicity rankings databases result from cadmium, fluoride, and chlorine discharges. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. As in prior years, EPA concludes the following:

- The fluoride discharges in the Mineral Mining Category result from phosphate and feldspar mining facilities regulated by Subpart R (Phosphate Rock) and Subpart AI (Feldspar; reserved), respectively. These facilities are also located in areas with naturally occurring fluoride compounds in the ore: Florida and North Carolina. Subparts R and AI do not regulate fluoride; however, permit limits are derived from state water quality standards.

- Feldspar Corporation likely discharged over 37,000 pounds of fluoride into the North Toe River in 2009; however, the discharge did not exceed mass-based permit limitations. Subpart AI (Feldspar) of the Mineral Mining Category does not currently regulate fluoride discharges. The North Carolina Division of Water Quality developed the fluoride permit limits using the state water quality standard. The Division monitors the North Toe River's in-stream fluoride concentration to ensure it does not exceed the water quality standard (Nowell, 2011). Because these feldspar mine fluoride discharges are geographically isolated to North Carolina and do not exceed water-quality-based permit limits, EPA will continue to review fluoride discharges from Feldspar Corporation as new data become available.

- The fluoride discharges from US Agri-Chemicals' operations were misrepresented in the toxicity rankings databases. The Mineral Mining Category is not applicable to these operations; rather, they fall within the Fertilizer Manufacturing Category (40 CFR Part 418). EPA will reassign this facility to the correct category and will review its discharges in future annual reviews under the Fertilizer Manufacturing Category.

- The three remaining Florida mines reviewed, Mosaic Fertilizer's Fort Green Mine Complex and Four Corners Mine and South Fort Meade Mine, have fluoride concentrations that do not exceed water-quality-based permit limitations (10 mg/L) or treatable concentrations (15 mg/L) using two-stage chemical precipitation with lime treatment systems. The FL DEP permit contact stated that fluoride discharges from these phosphate mines do not approach the state water quality standard and are therefore not a concern for permit writers (Champion, 2011).

- EPA identified database errors for discharges of cadmium and chlorine. After correcting these errors, the Mineral Mining Category TWPE from cadmium decreased by over 60 percent, from 17,600 to 6,740, and does not represent a hazard priority. The TWPE from chlorine decreased by over 90 percent, from 15,000 to 876, and therefore does not represent a hazard priority.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 Mineral Mining Category TWPE from 80,100 to 55,200. Excluding discharges from facilities that are not considered part of the 2011 Annual Reviews of the Mineral Mining Category, the TWPE decreases to 44,700. EPA will continue to review the Mineral Mining Category discharges to determine if they are properly controlled.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

13.8 Mineral Mining Category References

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14. NONFERROUS METALS MANUFACTURING (40 CFR PART 421)

EPA selected the Nonferrous Metals Manufacturing (NFMM) Category (40 CFR Part 421) for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. EPA reviewed discharges from the NFMM Category as part of the 2004, 2006, 2007, and 2009 reviews (U.S. EPA, 2004, 2006, 2007, 2009). This section summarizes the results of the 2011 Annual Reviews associated with the NFMM Category. EPA focused on discharges of mercury, fluoride, lead, cadmium, and molybdenum, because of their high TWPE relative to other pollutants in the NFMM Category. For further background on the NFMM Category, see the *Technical Support Document for the 2009 Effluent Guidelines Program Plan* (U.S. EPA, 2009).

14.1 NFMM Category 2011 Toxicity Rankings Analysis

Table 14-1 compares the toxicity rankings database results for the NFMM Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases increased from discharge year 2002 to 2008 and decreased from 2008 to 2009. The 2009 DMR TWPE accounts for approximately 81 percent of the combined 2009 DMR and TRI TWPE category, which is consistent with previous years.

Table 14-1. NFMM Category TRI and DMR Discharges for 2006 Through 2011 Toxicity Rankings Analyses

Year of Discharge	Year of Review	NFMM Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	51,800	397,000	449,000
2004	2007	52,600	321,000	374,000
2005	2008	41,800	NA	NA
2007	2009	38,900	343,000	382,000
2008	2010	38,700	463,000	503,000
2009	2011	40,500	174,000	215,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

14.2 NFMM Category Pollutants of Concern

EPA's review of the NFMM Category focused on the 2009 DMR discharges because the 2009 DMR data account for 81 percent of the category's combined TWPE. Table 14-2 lists the five pollutants with the highest DMR TWPE based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v2*, respectively). The top five DMR-reported pollutants in 2009 contribute more than 70 percent of the category's DMR TWPE. EPA's additional review of the NFMM Category's 2009 DMR database pollutants of concern focused on all top five pollutants, presented in the following subsections.

Table 14-2. 2009 NFMM Category Top DMR Pollutants

Pollutant	2008 DMR Database[a]			2009 DMR Database[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Mercury	4	6	34,500	1	4	29,100
Fluoride	5	17	26,100	2	17	24,700
Lead	1	26	183,000	3	20	24,300
Cadmium	3	15	53,400	4	11	22,900
Molybdenum	Pollutants not reported in the top five 2008 DMR-reported pollutants.			5	3	22,000
Polychlorinated biphenyls (PCBs)	2	2	93,400	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
NFMM Category Total	**NA**	**51[b]**	**463,000**	**NA**	**48[b]**	**174,000**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

14.3 NFMM Category Mercury Discharges in DMR

Mercury discharges from NFMM facilities in the 2009 DMR database account for over 16 percent of the category’s 2009 DMR TWPE. Table 14-3 presents the facilities with mercury discharges in the 2009 DMR database. Discharges of mercury from one facility, Alabama State Docks Mud Lakes (AL State Docks), account for over 99 percent of the category’s mercury DMR TWPE. As a result, EPA focused its review of mercury discharges on that facility.

Table 14-3. NFMM Category Top Mercury Discharging Facilities in the 2009 DMR Database

Facility Name	Facility Location	Total Pounds	Pollutant TWPE	Percent of Category's DMR Mercury TWPE
AL State Docks – Mud Lakes	Mobile, AL	249	29,100	> 99%
Remaining facilities reporting mercury[a]		0.23	26.7	< 1%
Total		**249**	**29,100**	**100%**

Source: DMRLoads2009_v2.

[a] There are three remaining facilities that have mercury discharges in the 2009 DMR database, which account for less than 1 percent of the category’s mercury DMR TWPE.

EPA reviewed the mercury discharges from AL State Docks as part of the 2010 Annual Reviews (see Section 7.4.2 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* for more information on the facility) (U.S. EPA, 2011). EPA determined that the facility’s discharges result from former aluminum ore tailings lakes, not from current manufacturing. AL State Dock’s 2009 mercury discharges are comparable to the facility’s 2008 discharges, which EPA verified as part of the 2010 Annual Reviews. Because the facility no longer operates as an aluminum ore mine and processing facility, its discharges do not warrant the need for revision of national effluent guidelines for this category. For these reasons, EPA is considering facility-specific permitting compliance to address this facility's mercury discharges.

14.4 NFMM Category Fluoride Discharges in DMR

Fluoride discharges from NFMM facilities in the 2009 DMR database account for approximately 14 percent of the category's DMR TWPE. Table 14-4 presents the facilities with fluoride discharges in the 2009 DMR database. Discharges of fluoride from one plant, Horsehead Corporation, account for 80 percent of the category's fluoride DMR TWPE. As a result, EPA focused its review of fluoride discharges on the top facility.

Table 14-4. NFMM Category Top Fluoride Discharging Facility in the 2009 DMR Database

Facility Name	Facility Location	Total Pounds	Pollutant TWPE	Percent of Category's DMR Mercury TWPE
Horsehead Corporation	Monaca, PA	656,000	19,700	80%
Remaining Facilities Reporting Fluoride [a]		166,000	4,990	20%
Total		**823,000**	**24,700**	**100%**

Source: DMRLoads2009_v2.

a There are 16 remaining facilities that have fluoride discharges in the 2009 DMR database, which account for 20 percent of the category's fluoride DMR TWPE.

Horsehead Corporation in Monaca, PA owns and operates a zinc smelter and ancillary units to produce zinc metal, zinc oxide, zinc dust, zinc sulfate, and sulfuric acid. Horsehead Corporation is a zinc smelter that is subject to 40 CFR Part 421 Subpart H (Primary Zinc Subcategory). Subpart H does not regulate fluoride discharges. From the 2009 DMR data, Horsehead Corporation is the only zinc smelter that reports fluoride discharges.

The facility discharges process wastewater through outfall 101 and noncontact cooling water through outfall 102 (PA DEP, 2001). The facility discharges the resulting commingled wastewater through outfall 001 to the Ohio River (PA DEP, 2001). The average flow for outfall 101 is 0.75 MGD, approximately 15 percent of the design flow through outfall 001 (5.1 MGD). The permit only requires monitoring for fluoride at the internal outfall 101. It does not set numerical limits and does not require monitoring of fluoride at outfall 001. Due to high levels of fluoride reported in the facility's 2000 permit application, the Pennsylvania Department of Environmental Protection required the facility to develop a pollution reduction report and monitor for fluoride.

As part of the 2011 Annual Reviews, EPA contacted Horsehead to confirm the fluoride discharges. The facility contact stated that the fluoride discharges at outfall 101 were accurate. The facility contact also stated that the primary sources of fluoride in the wastewater result from the crude zinc oxide (CZO) and calcined CZO processes. Both sources are responsible for approximately the same amount of fluoride in the process. The CZO enters the process through the CZO clarifier system. In the process, some fluoride may dissolve in the clarifier overflow, which is sent to the facility's wastewater treatment plant. The CZO filter cake is then processed in the sinter plant with calcine. The sinter plant generates sinter and a fume byproduct. The sinter is sent to the furnace plant, where the majority of the fluoride exits the process via discard slag. The plant also generates an aqueous waste stream, which is sent to the zinc sulfide clarifier system. Similar to the CZO clarifier system, some fluoride dissolves and is sent to the wastewater treatment plant via the clarifier overflow. The wastewater treatment includes clarification, designed to eliminate heavy metals. However, the clarifier does not remove fluoride due to the solubility of fluoride at the clarifier's operational pH range. Therefore, the discharge from outfall 101 contains fluoride (Swisher, 2011).

To estimate the fluoride load at the final effluent, EPA calculated the fluoride concentrations at the final effluent, outfall 001, using the 2009 DMR Loadings Tool fluoride concentration and flow data (0.75 MGD monthly average) for outfall 101 and the design flow (5.1 MGD) presented in the facility fact sheet for outfall 001 (PA DEP, 2001). Table 14-5 presents the 2009 DMR monthly fluoride and flow discharge data and the calculated fluoride concentrations at outfall 001 for Horsehead Corporation.

Treatment technologies available for fluoride discharges include two-stage chemical precipitation with lime treatment systems, a process similar to fluoride treatment at phosphatic fertilizer manufacturing facilities. This treatment process can achieve fluoride concentrations of 15 mg/L or less (U.S. EPA, 1974). Current technologies are achieving fluoride concentrations at least as effective, sometimes achieving 2 mg/L effluent fluoride. The chemical precipitation has improved with the use of calcium chloride rather than lime, while polymers and membrane filters have improved solids separation (WC&E, 2006; Ionics, n.d.; GCIP, 2002).

The fluoride concentrations reported at outfall 101 exceed treatable levels by an order of magnitude. Even following a 1:7 dilution, all calculated fluoride concentrations at outfall 001 exceed treatable levels, except for the calculated effluent concentration for December 2009. The state has identified the fluoride discharge as requiring a pollutant reduction plan but did not require a numerical effluent limit for fluoride. Therefore, EPA is considering facility-specific permitting support to address this facility's fluoride discharges.

Table 14-5. 2009 Monthly Fluoride and Flow Discharge Data for Horsehead Corporation

Monitoring Period Date	DMR Loadings Tool Monthly Average Fluoride Concentration at Outfall 101 (mg/L)	DMR Loadings Tool Monthly Average Flow for Outfall 101 (MGD)	Calculated Monthly Average Concentration at Outfall 001 (mg/L)
31-Jan-09	229	1.312	58.9
28-Feb-09	261	1.071	54.8
31-Mar-09	364	0.883	63.0
30-Apr-09	332	0.78	50.8
31-May-09	139	0.815	22.2
30-Jun-09	134	0.817	21.5
31-Jul-09	398	0.768	59.9
31-Aug-09	448	0.704	61.8
30-Sep-09	213	0.787	32.9
31-Oct-09	231	0.668	30.3
30-Nov-09	391	0.535	41.0

Table 14-5. 2009 Monthly Fluoride and Flow Discharge Data for Horsehead Corporation

Monitoring Period Date	DMR Loadings Tool Monthly Average Fluoride Concentration at Outfall 101 (mg/L)	DMR Loadings Tool Monthly Average Flow for Outfall 101 (MGD)	Calculated Monthly Average Concentration at Outfall 001 (mg/L)
31-Dec-09	178	0.285	9.9

Source: DMR Loadings Tool.

14.5 NFMM Category Lead Discharges in DMR

Lead discharges from NFMM facilities in the 2009 DMR database account for approximately 14 percent of the category's DMR TWPE. Table 14-6 presents the facilities with lead discharges in the 2009 DMR database. Discharges of lead from one facility, Buick Resources Recycling in Bixby, MO, account for 87 percent of the category's lead DMR TWPE. Accordingly, EPA focused its review on Buick Resource Recycling.

Table 14-6. NFMM Category Top Lead Discharging Facility in the 2009 DMR Database

Facility Name	Facility Location	Total Pounds	Pollutant TWPE	Percent of Category's DMR Mercury TWPE
Buick Resource Recycling	Bixby, MO	9,470	21,200	87%
Remaining facilities reporting lead[a]		1,360	3,050	13%
Total		**10,800**	**24,300**	**100%**

Source: DMRLoads2009_v2.

[a] There are 19 remaining facilities that have lead discharges in the 2009 DMR database, which account for 13 percent of the category's lead DMR TWPE.

Buick Resource Recycling, owned by the Doe Run Company, is a secondary lead smelting plant that recycles lead-acid batteries and other lead-bearing hazardous and non-hazardous wastes. The wastes are recycled to recover the lead, other trace metals, sulfuric acid, and polyethylene plastic (Doe Run, 2004). Buick Resource Recycling discharges wastewater from three outfalls, and the permit requires lead monitoring at all three. Outfall 001 discharges industrial process wastewater, process stormwater, and primary treated sanitary water. Outfalls 002 and 003 discharge stormwater runoff and settling basin and storm emergency overflow.

Part 421, Subpart M, Secondary Lead Manufacturing, sets limits for lead, as well as other pollutants (e.g., 0.189 milligrams per kilogram (mg/kg) of lead as the BAT daily maximum for battery cracking). The facility's permit sets lead limits for outfall 001 at 0.47 kg/day monthly average and 1.17 kg/day (0.19 mg/L) daily maximum (MO DNR, 2003). The permit also states that discharges from outfalls 002 and 003 are not authorized unless the combined flows of outfalls 001, 002, and 003 meet the limitations of outfall 001 (MO DNR, 2003).

Table 14-7 presents Buick Resource Recycling's 2009 DMR monthly lead concentration data for outfalls 001, 002, and 003. EPA back calculated the maximum lead concentrations from the lead quantities and flow for outfalls 002 and 003. Using this methodology, EPA determined that all of the daily maximum lead quantities and back-calculated concentrations for outfalls 002 and 003 exceed the daily maximum permit limitation. EPA's Office of Civil Enforcement is working with this facility to resolve compliance issues and Doe Run is required to lower lead discharges at all facilities in Missouri (including the Buick Resource Recycling facility) due to an EPA enforcement settlement. Because of the settlement, EPA considers this facility's discharges as not representative of the whole category, and that the facility's discharges are being controlled through EPA's compliance process (U.S. EPA, 2010).

Table 14-7. 2009 Monthly Lead and Flow Discharge Data for Buick Resource Recycling

Monitoring Date	DMR Loadings Tool Maximum Lead Quantity (kg/day)	Back-Calculated Maximum Lead Concentration (mg/L)	DMR Loadings Tool Monthly Maximum Flow (MGD)
Outfall 001[a]			
31-Jan-09	0.023	0.015	0.388
28-Feb-09	0.161	0.111	0.382
31-Mar-09	0.000	0.000	0.362
30-Apr-09	0.152	0.077	0.52
31-May-09	0.053	0.023	0.599
30-Jun-09	0.372	0.174	0.565
31-Jul-09	0.007	0.005	0.376
31-Aug-09	0.043	0.036	0.314
30-Sep-09	0.052	0.028	0.497
31-Oct-09	0.075	0.030	0.658
30-Nov-09	0.218	0.100	0.575
31-Dec-09	0.204	0.149	0.363
Outfall 002			
31-Jan-09	NODI C	NODI C	NODI C
28-Feb-09	NODI C	NODI C	NODI C
31-Mar-09	NODI C	NODI C	NODI C
30-Apr-09	NODI C	NODI C	NODI C
31-May-09	NODI C	NODI C	NODI C
30-Jun-09	0.211	0.30	0.185
31-Jul-09	NODI C	NODI C	NODI C
31-Aug-09	NODI C	NODI C	NODI C
30-Sep-09	NODI C	NODI C	NODI C
31-Oct-09	59.5	23.1	0.68
30-Nov-09	32.1	29.7	0.28
31-Dec-09	NODI C	NODI C	NODI C
Outfall 003			
31-Jan-09	NODI C	NODI C	NODI C
28-Feb-09	1.68	0.602	0.74
31-Mar-09	NODI C	NODI C	NODI C
30-Apr-09	2.73	2.41	0.3
31-May-09	NODI C	NODI C	NODI C
30-Jun-09	25.1	8.06	0.82
31-Jul-09	NODI C	NODI C	NODI C

Table 14-7. 2009 Monthly Lead and Flow Discharge Data for Buick Resource Recycling

Monitoring Date	DMR Loadings Tool Maximum Lead Quantity (kg/day)	Back-Calculated Maximum Lead Concentration (mg/L)	DMR Loadings Tool Monthly Maximum Flow (MGD)
31-Aug-09	NODI C	NODI C	NODI C
30-Sep-09	NODI C	NODI C	NODI C
31-Oct-09	38.5	2.118	4.81
30-Nov-09	3.99	3.71	0.28
31-Dec-09	NODI C	NODI C	NODI C

Sources: DMR Loadings Tool and facility-provided information (Lanzafame, 2011).

[a] The quantities, concentrations, and flow presented for outfall 001 are for the monthly average values.

NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

14.6 NFMM Category Cadmium Discharges in DMR

Cadmium discharges from NFMM facilities in the 2009 DMR database account for approximately 13 percent of the category's DMR TWPE. Table 14-8 presents facilities with cadmium discharges in the 2009 DMR database. EPA focused its review of cadmium discharges on the top three facilities, which account for 89 percent of the category's cadmium 2009 DMR TWPE. However, two of the top three cadmium dischargers, both Doe Run facilities in Missouri, are currently under compliance and enforcement actions with U.S. EPA's Office of Civil Enforcement. Due to the enforcement settlement, the Doe Run Herculaneum facility is required to shut down by December 21, 2013, and the Doe Run Glover Smelter discharges are being reviewed for compliance (U.S. EPA, 2010). As a result, EPA refocused its review of cadmium discharges on the third facility, Nyrstar Clarksville.

Table 14-8. NFMM Category Top Cadmium Discharging Facilities in the 2009 DMR Database

Facility Name	Facility Location	Total Pounds	Pollutant TWPE	Percent of Category's Total DMR Cadmium TWPE
Nyrstar Clarksville, Inc.	Clarksville, TN	385	8,910	39%
Doe Run, Glover Smelter[a, b]	Annapolis, MO	307	7,090	31%
Doe Run, Herculaneum Smelter[b]	Herculaneum, MO	190	4,390	19%
Remaining facilities reporting cadmium[b]		108	2,490	11%
Total		**990**	**22,900**	**100%**

Source: DMRLoads2009_v2.

[a] On December 1, 2003, operations at the Doe Run Glover Smelter, a lead smelter, were placed on "care and maintenance" status. While on care and maintenance, the facility and equipment were kept operationally ready and maintained all permits (Doe Run, 2004).

[b] Due to an EPA enforcement settlement, the Doe Run Herculaneum facility has not operated for several years and will be completely shut down by December 21, 2013. The results of the settlement also required Doe Run to lower cadmium discharges at all its facilities in Missouri (including Glover Smelter). Because the cadmium discharges are already being reviewed as part of the settlement, EPA will not review the facility discharges as part of the 2011 Annual Reviews (U.S. EPA, 2010).

[c] There are 8 remaining facilities that have cadmium discharges in the 2009 DMR database, which account for 11 percent of the category's cadmium DMR TWPE.

14.6.1 Nyrstar Clarksville, Inc.

Nyrstar Clarksville, Inc., in Clarksville, TN (Nyrstar) produces zinc metal from beneficiation of zinc concentrate ore by a hydrometallurgical process. As secondary products, this facility also co-produces cadmium metal, sulfuric acid, and metallurgically valuable byproducts (TN DEC, 2005). Nyrstar discharges cadmium from its outfall 001, which discharges treated process wastewater, sanitary wastewater, and cooling water (TN DEC, 2006).

Part 421, Subpart H, Primary Zinc Manufacturing, sets limits for cadmium (e.g., 0.334 mg/kg lead as the BAT daily maximum for the zinc reduction furnace wet air pollution control). The facility's permit limits cadmium to a monthly average of 0.798 kg/day and a daily maximum of 1.99 kg/day (TN DEC, 2006). The facility fact sheet included the corresponding concentrations for these limits: 0.317 mg/L monthly average and 0.793 mg/L daily maximum (TN DEC, 2005). The NFMM ELG limits cadmium discharges in plant wastewater to 0.494 mg/kg of cadmium produced as a monthly average and 1.23 mg/kg of cadmium produced as a daily maximum.

Treatment technologies available for cadmium discharges include two-stage chemical precipitation with lime addition or two-stage chemical precipitation with settling and filtering, a process similar to cadmium treatment at centralized waste treaters and/or metal finishing manufacturing facilities. These treatment processes can achieve cadmium concentrations of 0.13 mg/L or 0.044 mg/L, respectively (ERG, 2006).

Table 14-9 presents Nyrstar's 2009 monthly average cadmium quantity and flow data from the DMR Loadings Tool for outfall 001. Table 14-9 also includes EPA's back-calculated monthly cadmium concentrations, derived using the monthly average quantity and flow. The

June 2009 monthly average quantity exceeds the facility permit limit and is above the fact sheet's cadmium concentration basis. EPA also determined that the back-calculated concentrations are above treatable levels. Based on these findings, these discharges do not indicate the need for revision of national effluent guidelines, but rather facility-specific permitting and compliance assistance.

Table 14-9. 2009 Monthly Cadmium and Flow Discharge Data for Nyrstar's Outfall 001

Monitoring Date	DMR Loadings Tool Average Monthly Cadmium Quantity (kg/day)	DMR Loadings Tool Maximum Monthly Cadmium Quantity (kg/day)	Back-Calculated Average Cadmium Concentration (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Jan-09	0.358	0.372	0.19	0.51
28-Feb-09	0.367	0.603	0.17	0.56
31-Mar-09	0.467	0.667	0.21	0.58
30-Apr-09	0.390	0.449	0.17	0.61
31-May-09	0.476	0.508	0.18	0.72
30-Jun-09	0.807	0.821	0.39	0.55
31-Jul-09	0.372	0.404	0.16	0.63
31-Aug-09	0.426	0.444	0.19	0.60
30-Sep-09	0.558	0.567	0.21	0.69
31-Oct-09	0.472	0.508	0.19	0.66
30-Nov-09	0.512	0.825	0.21	0.63
31-Dec-09	0.540	0.571	0.20	0.73

Source: DMR Loadings Tool.

14.7 NFMM Category Molybdenum Discharges in DMR

Molybdenum discharges from NFMM facilities in the 2009 DMR database account for approximately 12 percent of the category's DMR TWPE. Table 14-10 presents the facilities with molybdenum discharges in the 2009 DMR database. Discharges of molybdenum from one facility, GulfChem & Metallurgical Corporation in Freeport TX, account for over 99 percent of the category's molybdenum DMR TWPE. Accordingly, EPA focused its review on GulfChem.

Table 14-10. NFMM Category Top Molybdenum Discharging Facility in the 2009 DMR Databases

Facility Name	Facility Location	Total Pounds	Pollutant TWPE	Percent of Category's DMR Mercury TWPE
GulfChem & Metallurgical Corp	Freeport, TX	110,000	22,000	> 99%
Remaining facilities reporting molybdenum[a]		74.6	14.9	< 1%
Total		**110,000**	**22,000**	**100%**

Source: DMRLoads2009_v2.

[a] There are two remaining facilities that have molybdenum discharges in the 2009 DMR database, which account for less than 1 percent of the category's molybdenum DMR TWPE.

GulfChem operates a plant that recovers metals (molybdenum and vanadium) from spent refinery hydro-desulfurizing catalysts. The plant discharges molybdenum from its outfalls 001 and 002. Outfall 001 discharges process wastewater, cooling water, domestic sewage, and stormwater runoff from the facility.

Part 421, Subpart T, sets limits for molybdenum from many secondary molybdenum processes (e.g., 0.000 mg/kg for molybdenum drying wet air pollution control). However, molybdenum limits for several subcategories for Part 421, Subpart T, are reserved for both BPT and BAT:

- Leach tailings
- Molybdenum filtrate solvent extraction raffinate
- Pure grade molybdenum

The facility's permit limits molybdenum for outfall 001 at 36.7 kg/day monthly average and 82 kg/day daily maximum. Outfall 002 is a stormwater outfall with a daily maximum molybdenum permit limit of 30 mg/L (TCEQ, 2003).

Table 14-11 presents the 2009 monthly molybdenum discharges for GulfChem from the 2009 DMR database. EPA compared the data from the DMR Loadings Tool to the publically available data in Envirofacts. EPA determined that the April 2009 concentration for outfall 002 was a data entry error, given previous months of data available in Envirofacts. Using a corrected value of 19.3 mg/L for that concentration, GulfChem's 2009 molybdenum discharges are 39,600 pounds and 7,920 TWPE, reducing the facility's total TWPE by over 51 percent. This reduction decreases the NFMM Category's 2009 DMR TWPE by 14,100, making molybdenum no longer a top pollutant of concern.

EPA also compared the data to the facility's permit limits and determined that the outfall 001 January, April, July, August, and December 2009 molybdenum quantities exceed the mass-based permit limits. As a result, EPA recommends facility-specific permitting and compliance assistance to control molybdenum discharges from the GulfChem facility.

Table 14-11. 2009 Monthly Molybdenum Data for GulfChem's Outfalls 001 and 002

Monitoring Period Date	DMR Loadings Tool Average Molybdenum Quantities (kg/day)[a]	DMR Loadings Tool Average Molybdenum Concentrations (mg/L)[b]	Corrected DMR Loadings Tool Average Molybdenum Concentrations (mg/L)
Outfall 001			
31-Jan-09	58.2	61.5	NA
28-Feb-09	18.7	16.5	NA
31-Mar-09	13.2	11.9	NA
30-Apr-09	70.1	51.6	NA
31-May-09	17.9	15.4	NA
30-Jun-09	31.5	24.4	NA
31-July-09	47.7	37.6	NA
31-Aug-09	107.9	94.7	NA
30-Sep-09	23.2	23.1	NA

Table 14-11. 2009 Monthly Molybdenum Data for GulfChem's Outfalls 001 and 002

Monitoring Period Date	DMR Loadings Tool Average Molybdenum Quantities (kg/day)[a]	DMR Loadings Tool Average Molybdenum Concentrations (mg/L)[b]	Corrected DMR Loadings Tool Average Molybdenum Concentrations (mg/L)
31-Oct-09	72.7	75.1	NA
30-Nov-09	12.8	12.9	NA
31-Dec-09	44.6	45.7	NA
Outfall 002			
31-Jan-09	NODI C	NODI C	NA
28-Feb-09	NODI C	NODI C	NA
31-Mar-09	7.15	7	NA
30-Apr-09	1,512	1,930	19.3
31-May-09	3.87	16.5	NA
30-Jun-09	NODI C	NODI C	NA
31-July-09	NODI C	NODI C	NA
31-Aug-09	NODI C	NODI C	NA
30-Sep-09	NODI C	NODI C	NA
31-Oct-09	21	16.6	NA
30-Nov-09	32.6	23.3	NA
31-Dec-09	46.6	20.8	NA

Source: DMRLoads2009_v2.

[a] EPA calculated the average monthly quantity for outfall 002 using the average concentration (mg/L) and the flow (MGD) because the facility did not report a quantity value.

[b] EPA calculated the average monthly concentration for outfall 001 using the average quantity (kg/day) and the flow (MGD) because the facility did not report a concentration value.

NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

14.8 NFMM Category Conclusions

Based on available data, the estimated toxicity of the NFMM Category discharges in the toxicity rankings databases results from mercury, fluoride, lead, cadmium, and molybdenum discharges. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. As in prior years, EPA concludes the following:

- The mercury discharges from the NFMM Category result from one facility, AL State Docks. EPA determined that this facility's mercury discharges are legacy discharges from previous aluminum ore mining and processing operations that have since been shut down. EPA believes that these discharges do not indicate the need for revision of national effluent guidelines and is considering facility-specific permitting compliance to address this facility's mercury discharges.

- The fluoride discharges from the NFMM Category result from one facility, Horsehead Corporation. The facility contact confirmed the 2009 fluoride discharges from outfall 101. EPA determined that this facility is reporting fluoride discharges from an internal monitoring point, prior to commingling with another outfall at the final effluent. However, EPA's calculated concentrations at the final effluent are still higher than treatable levels achieved by two-stage chemical precipitation with a lime treatment system. The facility contact also confirmed that the wastewater treatment does not specifically target fluoride. EPA is considering facility-specific permitting support to address this facility's fluoride discharges. EPA will continue to review fluoride discharges from Horsehead Corporation.

- The lead discharges result from one facility: Buick Resource Recycling, which exceeded its maximum mass-based lead permit limits for all reporting periods in 2009 for stormwater outfalls 002 and 003. U.S. EPA's Office of Civil Enforcement already identified compliance and operation problems with the Doe Run facility and is already addressing the lead discharges.

- The cadmium discharges from the NFMM Category results from three facilities, Nyrstar Clarksville, Inc., and two Doe Run lead smelters (Glover and Herculaneum). EPA's Office of Civil Enforcement already identified compliance and operation problems with the two Doe Run facilities and is already addressing these facilities' discharges. Nyrstar exceeded its monthly average permit limits for one month in 2009, and the back-calculated cadmium concentrations are above treatable levels. The existing regulations already set limits for cadmium; therefore, EPA recommends facility-specific permitting to control cadmium discharges at this facility.

- The molybdenum discharges from the NFMM Category come from one facility, GulfChem & Metallurgical Corporation. EPA identified a database error for this facility. With it corrected, the NFMM Category's molybdenum TWPE decreased by 64 percent, from 22,000 to 7,900; this means it is no longer a hazard priority. However, the molybdenum discharges for this facility also exceed the monthly average mass-based permit limit for five months in 2009. Therefore, EPA recommends facility-specific permitting and compliance assistance for this facility.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 NFMM Category TWPE from 215,000 to 200,900. Excluding discharges from facilities that are closed or imminently closing, the TWPE decreases to 168,200. As new data become available, EPA will continue to review discharges from the NFMM Category to determine if the discharges are properly controlled.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(2)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

14.9 NFMM Category References

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15. ORGANIC CHEMICALS, PLASTICS, AND SYNTHETIC FIBERS (40 CFR PART 414)

EPA selected the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. EPA reviewed discharges from the OCPSF Category as part of the 2004 through 2010 reviews (U.S. EPA, 2004, 2005a, 2005b, 2006, 2007, 2008, 2009, 2011). This section summarizes the results of the 2011 Annual Reviews associated with the OCPSF Category. EPA focused on discharges of PCB-1242 and hexachlorobenzene because of their high TWPE relative to other pollutants in the OCPSF Category. For further background of the OCPSF Category, see the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2011).

EPA recently reviewed discharges from the chlorinated hydrocarbon manufacturing segment of the OCPSF Category as part of the Chlorine and Chlorinated Hydrocarbons effluent guidelines rulemaking. EPA is proposing to delist chlorinated hydrocarbon manufacturing from the effluent guidelines plan and discontinue the rulemaking. Given this, these facilities were excluded from further consideration in this toxicity ranking analysis (see Table 8-1, in the Preliminary 2012 Plan (U.S. EPA, 2013)).

15.1 OCPSF Category 2011 Toxicity Rankings Analysis

Table 15-1 compares the toxicity rankings analysis results for the OCPSF Category from the 2006 through 2011 Annual Reviews. The 2009 discharge monitoring report (DMR) TWPE accounts for approximately 79 percent of the combined 2009 DMR and Toxics Release Inventory (TRI) TWPE, while TRI discharges dominated previous years' combined TWPE.

Table 15-1. OCPSF Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	OCPSF Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	349,000	398,000	747,000
2004	2007	957,000	608,000	1,570,000
2005	2008	759,000	NA	NA
2007	2009	575,000	309,000	884,000
2008	2010	137,000	512,000	649,000
2009	2011	146,000	541,000	687,000

Source: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. DMR 2008 and 2009 data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

15.2 OCPSF Pollutants of Concern

EPA's review of the OCPSF Category focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 15-2 compares the five.

Table 15-2. OCPSF Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
PCB-1242	Pollutants not reported in the top five 2008 DMR-reported pollutants.			1	1	240,000
Hexachlorobenzene	1	11	124,000	2	9	131,000
Chlorine	2	104	77,800	3	95	75.800
Tin	Pollutants not reported in the top five 2008 DMR-reported pollutants.			4	3	16,400
Fluoride				5	11	11,000
Nickel	3	68	59,500	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
Copper	4	133	42,100			
Fluoride	5	16	28,900			
OCPSF Category Total	**NA**	**357[b]**	**512,000**	**NA**	**319[b]**	**541,000**

Sources: *DMRLoads2008_v2* and *DMRLoads2009_v2*.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting TWPE greater than zero.

NA: Not applicable.

pollutants with the highest TWPE in the 2009 and 2008 DMR databases (*DMRLoads2009_v2* and *DMRLoads2008_v2,* respectively).

PCB-1242 and hexachlorobenzene compose the majority (approximately 70 percent) of the 2009 DMR TWPE for the OCSPF Category. The PCB-1242 discharges in the 2009 DMR database are from only one facility, Solutia, Inc., in Anniston, AL. PCBs are no longer manufactured in the United States and are used in a limited number of products. Therefore, PCB discharges are typically legacy issues and require facility-specific permitting support (40 CFR Part 761.50). EPA is not prioritizing the PCB discharges for review as part of the 2011 Annual Reviews because the discharges are from only one facility and PCBs are typically legacy issues.

15.3 OCPSF Category Hexachlorobenzene Dischargers in DMR

EPA's 2011 Annual Reviews of the OCPSF Category focused on hexachlorobenzene discharges. Hexachlorobenzene discharges in the 2009 DMR database account for 24 percent of the total DMR TWPE. Table 15-3 presents the hexachlorobenzene dischargers in the 2009 DMR database. Discharges of hexachlorobenzene from three facilities account for over 90 percent of the category's hexachlorobenzene DMR TWPE. As a result, EPA focused its review of hexachlorobenzene discharges on the top three facilities.

Table 15-3. OCPSF Category Hexachlorobenzene Dischargers in the 2009 DMR Database

Facility Name	Hexachlorobenzene Pounds Discharged	Hexachlorobenzene TWPE	Facility Percent of Hexachlorobenzene Category TWPE
Daikin America Inc.	29.2	56,900	44%
Chevron Oronite Co., LLC, Oak Point Plant	25.6	49,800	38%
Nalco Company	6.21	12,100	9%
Remaining facilities reporting hexachlorobenzene discharges[a]	6.26	12,100	9%
Total			**100%**

Source: DMRLoads2009_v2.

[a] There are three remaining facilities that have hexachlorobenzene discharges in the 2009 DMR database, which account for 3 percent of the category's hexachlorobenzene DMR TWPE.

15.3.1 Daikin American, Inc.

Daikin American in Decatur, AL, discharges hexachlorobenzene from one outfall, outfall 001, which carries treated process wastewater from a fluorocarbon production facility (ADEM, 2003a). Table 15-4 presents the 2009 DMR hexachlorobenzene concentrations compared to the facility's permit and limit from Subpart J of the OCPSF effluent limitations guidelines, or ELGs.[9] The facility's permit requires that hexachlorobenzene be reported annually as a quantity. EPA calculated the 2009 concentrations using the quantities and flow from the 2009 DMR database. EPA calculated the 2009 permit limit concentrations using the permit limit quantities and the flows from the facility's permit fact sheet (ADEM, 2003b). The facility's fact sheet also states that the hexachlorobenzene permit limits are based on the human health criteria. Therefore,

[9] See Section 12.1.2 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2011) for details on the OCPSF ELGs.

Table 15-4. 2009 DMR Hexachlorobenzene Discharges for Daikin American, Inc.

	2009 DMR Database Data			Permit Limits and Fact Sheet Data			ELG Limits (mg/L)
	Quantity (kg/day)	Flow (MGD)	Calculated Concentration (mg/L)	Quantity (kg/day)	Flow (MGD)[a]	Calculated Concentration (mg/L)	
Daily maximum	0.0363	1.07	0.00896	0.0862	0.79	0.0288	0.794
Monthly average	0.0363	1.07	0.00896	0.0544	0.79	0.0182	0.196

Sources: Facility permit and fact sheet (ADEM, 2003a, 2003b) and DMRLoads2009_v2.

a Flow is reported only in the facility permit; this value is based on the facility's permit fact sheet.

the permit limits are based on facility-specific permitting support rather than the OCPSF ELGs (ADEM, 2003b). As shown in Table 15-4, the calculated daily maximum and monthly average concentrations do not exceed the OCPSF ELG hexachlorobenzene limits or the facility-specific permit limits based on the water quality criteria for human health.

15.3.2 Chevron Oronite Co., LLC, Oak Point Plant

Chevron Oronite, Oak Point Plant, in Belle Chasse, LA, discharges hexachlorobenzene from outfall 202. This continuous, internal discharge consists of treated process wastewater and process area stormwater (LADEQ, 2009a). Table 15-5 presents the 2008 and 2009 hexachlorobenzene data for Chevron Oronite.

Table 15-5. 2008 and 2009 Hexachlorobenzene Discharge Data for Chevron Oronite Outfall 202

Monitoring Period	DMR Loadings Tool Quantity (kg/day)	Flow (MGD)
31-Dec-08	0.0544	1.132
31-Dec-09	0.0317	2.527

Source: DMR Loadings Tool.

EPA contacted Chevron Oronite about the 2008 DMR discharges of hexachlorobenzene as part of the 2010 Annual Reviews. Chevron Oronite indicated that all of the 2008 hexachlorobenzene quantities had been measured below the detection limit; they had therefore used half of the detection limit to calculate the reported quantities (Sampey, 2010). Accordingly, EPA determined that all of the quantities in the 2008 DMR database were based on non-detect sample results and the loads and, for annual review purposes, TWPE should be zero (U.S. EPA, 2011). As shown in Table 15-5, the 2009 hexachlorobenzene quantities are less than the 2008 quantities. The 2009 DMR data are consistent with 2008; EPA concludes that for annual review purposes, the TWPE should be zero. With this error corrected the facility’s total TWPE decreases from 55,800 to 6,000, a reduction of over 89 percent.

15.3.3 Nalco Company

Nalco Company discharges hexachlorobenzene from outfall 001, a continuous discharge of treated process wastewater (LADEQ, 2009b). Table 15-6 presents the 2009 DMR hexachlorobenzene concentrations compared to the facility’s permit and limit from Subpart H of the OCPSF ELGs.[10] The facility’s permit requires that hexachlorobenzene be reported annually as a quantity. EPA calculated the 2009 concentrations using the quantities and flow from the 2009 DMR database. EPA calculated the 2009 permit limit concentrations using the permit limit quantities and the estimated flow from the facility’s permit. As shown in Table 15-6, the reported daily maximum and monthly average concentrations do not exceed the hexachlorobenzene limits in the facility’s permit or the OCPSF ELGs.

[10] See Section 12.1.2 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2011) for details on the OCPSF ELGs.

Table 15-6. 2009 DMR Hexachlorobenzene Discharges for Nalco Company

	2009 DMR Database Data			Permit Limits and Fact Sheet Data			ELG Limits (mg/L)
	Quantity (kg/day)	Flow (MGD)	Calculated Concentration (mg/L)	Quantity (kg/day)	Flow (MGD)[a]	Calculated Concentration (mg/L)	
Daily maximum	0.0077	0.503	0.00405	0.0454	0.514	0.0233	0.028
Monthly average	0.0077	0.503	0.00405	0.0227	0.514	0.0117	0.015

Source: Facility Permits (LADEQ, 2009b) and *DMRLoads_2009_v2*.

[a] Flow is reported only in the facility permit; this value is based on the facility's permit fact sheet.

15.4 OCPSF Category Conclusions

The estimated toxicity of the OCSPF Category discharges results from PCB-1242 and hexachlorobenzene discharges. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- The PCB-1242 discharges are reported by one facility, Solutia, Inc., in Anniston, Alabama. PCBs are no longer manufactured in the United States, so PCB discharges are typically legacy issues (40 CFR Part 761.50). EPA determined that the PCB discharges are not representative of the category because they come from only one facility and are typically legacy issues. Therefore, the PCB discharges should be controlled using facility-specific permitting support. EPA excluded the facility's discharges from further review.

- Three facilities, Daikin American, Inc., Chevron Oronite, and Nalco Company, contribute the majority of the hexachlorobenzene discharges for the OCPSF Category.

- Chevron Oronite indicated that the 2008 hexachlorobenzene quantities were based on non-detect sampling results. The facility's 2009 hexachlorobenzene quantities are on the same order of magnitude as the 2008 values; therefore, EPA suspects that the 2009 quantities are also based on non-detect sampling results. Accordingly, EPA determined that Chevron Oronite's 2009 hexachlorobenzene load and TWPE should be zero. Correcting this error decreases the facility's 2009 TWPE from 55,800 to 6,000.

- The hexachlorobenzene discharges from Daikin American, Inc., and Nalco Company are below the ELGs and the facilities' permit limits. Although hexachlorobenzene is present, the discharge concentrations are an order of magnitude below the ELGs. As new data become available, EPA will review hexachlorobenzene discharges from the OCPSF Category to determine if the same conclusions apply.

- Correcting the database errors identified during the 2011 Annual Reviews decreases the 2009 OCPSF Category TWPE from 687,000 to 397,000. The OCSPF Category continues to rank high due to the high number of facilities (over 2,000) in the industry. As new data becomes available, EPA will continue to review the OCSPF Category discharges to determine if they are properly controlled.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

15.5 OCSPF Category References

1. ADEM. 2003a. Alabama Department of Environmental Management. *NPDES Permit: Daikin America, Inc., Decatur, AL.* EPA-HQ-OW-2010-0824. DCN 07608.

2. ADEM. 2003b. Alabama Department of Environmental Management. *NPDES Permit Fact Sheet: Daikin America, Inc., Decatur, AL.* EPA-HQ-OW-2010-0824. DCN 07609.

3. LADEQ. 2009a. Louisiana Department of Environmental Quality, Environmental Services. *NPDES Permit: Chevron Oronite Company, LLC, Oak Point Plant, Belle Chasse, LA.* EPA-HQ-OW-2010-0824. DCN 07610.

4. LADEQ. 2009b. Louisiana Department of Environmental Quality, Environmental Services. *NPDES Permit: Nalco Company, Garyville Facility, Garyville, LA.* EPA-HQ-OW-2010-0824. DCN 07611.

5. Sampey, Troy. 2010. E-mail Communication Between Troy Sampey, Chevron Oronite Co., and Elizabeth Sabol, Eastern Research Group, Inc., Re: DMRs Clarification Needed for Chevron Oronite—Oak Point Plant. (July 13). EPA-HQ-OW-2010-0824. DCN 07296.

6. U.S. EPA. 2004. *Technical Support Document for the 2004 Effluent Guidelines Program Plan*. Washington, D.C. (August). EPA-821-R-04-014. EPA-HQ-OW-2003-0074-1346 through 1352.

7. U.S. EPA. 2005a. *Preliminary 2005 Review of Prioritized Categories of Industrial Dischargers*. Washington, D.C. (August). EPA-821-B-05-004. EPA-HQ-OW-2004-0032-0016.

8. U.S. EPA. 2005b. Product and Product Group Discharges Subject to Effluent Limitations and Standards for the Organic Chemicals, Plastics, and Synthetic Fibers Point Source Category. Washington, D.C. (April). EPA-HQ-OW-2004-032-2568.

9. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. Washington, D.C. (December). EPA-821-R-06-018. EPA-HQ-OW-2004-0032-2782.

10. U.S. EPA. 2007. *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-821-R-07-007. EPA-HQ-OW-2006-0771-0819.

11. U.S. EPA. 2008. *Technical Support Document for the 2008 Effluent Guidelines Program Plan*. Washington, D.C. (August). EPA-821-R-08-015. EPA-HQ-OW-2006-0771-1701.

12. U.S. EPA. 2009. *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-821-R-09-006. EPA-HQ-OW-2008-0517-0515.

13. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan.* Washington, D.C. (October). EPA-820-R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

14. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

16. OIL & GAS EXTRACTION (40 CFR PART 435)

EPA selected the Oil and Gas Extraction (Oil and Gas) Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. The Final 2010 Plan summarizes the results of EPA's previous review of this industry in 2010 (U.S. EPA, 2011). EPA also reviewed discharges from this industry, specifically the coalbed methane (CBM) sector, in 2004 and 2005 (71 FR 76644, December 21, 2006). See Section 16.2 of the Final 2010 Plan for information on EPA's detailed study of the CBM sector (U.S. EPA, 2011). As a result of this detailed study, EPA announced in the Final 2010 Plan its intent to review discharges from the CBM segment of the Oil and Gas Category as part of the CBM effluent guidelines rulemaking. Also announced in the Final 2010 ELG Program Plan, EPA initiated a rulemaking for shale gas extraction, another subcategory of the Oil and Gas Category, which includes ELGs for direct discharge but not pretreatment standards. For more information on shale gas extraction, see the Final 2010 Plan (76 FR 66286).

At this time, however, EPA is proposing to delist from rulemaking in the effluent guidelines plan the CBM extraction subcategory (see Section 4.1.1 of the Preliminary 2012 Plan for more details). EPA plans to continue to address shale gas extraction under its proposed rulemaking titled "ELG Revisions to Address Discharges from Unconventional Oil and Gas Extraction".

Because rulemakings for the CBM and shale gas extraction segments of the Oil and Gas Category were, or are, currently under consideration, EPA excluded discharges from these facilities from further consideration in this review (see Table V-1, 76 FR 66286, October 26, 2011).

This section summarizes the results of the 2011 Annual Reviews associated with the Oil and Gas Category. EPA focused on discharges of sulfide from one facility, because of its high TWPE relative to the other facilities in the Oil and Gas Category.

16.1 Oil and Gas Category 2011 Toxicity Rankings Analysis

Table 16-1 compares the toxicity rankings analysis results for the Oil and Gas Category from the 2006 through 2011 Annual Reviews. The combined discharge monitoring report (DMR) and Toxics Release Inventory (TRI) TWPE increased from discharge years 2007 to 2009. Since 2007, the combined TWPE is based only on DMR data because no facilities reported water discharges to TRI for 2007 through 2009. EPA's review of the Oil and Gas Category focused on the 2009 DMR discharges because no facilities reported water discharges to TRI in 2009.

Table 16-1. Oil and Gas Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Oil and Gas Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	700	1.18	701
2004	2007	596	17.8	614
2005	2008	802	NA	NA

Table 16-1. Oil and Gas Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Oil and Gas Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2007	2009	NR	255	255
2008	2010	NR	189,000	189,000
2009	2011	NR	238,000	238,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. DMR 2008 and 2009 data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

NR: Not reported. No facilities reported water discharges to TRI for reporting years 2007 through 2009.

16.2 Oil and Gas Category Pollutants of Concern

Table 16-2 lists the five pollutants with the highest TWPE in DMR data from reporting years 2009 and 2008 (*DMRLoads2009_v2* and *DMRLoads2008_v3*, respectively). Sulfide is the top DMR pollutant in 2009, contributing approximately 94 percent of the total category TWPE for 2009. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews because the remaining TWPE is only six percent of the 2009 combined TWPE for the Oil and Gas Category.

Table 16-2. Oil and Gas Category Top DMR Pollutants

Pollutant	2008 DMR Database[a]			2009 DMR Database[a]		
	Rank	**Number of Facilities Reporting Pollutant**	**TWPE**	**Rank**	**Number of Facilities Reporting Pollutant**	**TWPE**
Sulfide	1	3	170,000	1	3	224,000
Chloride	3	12	7,340	2	20	10,700
Fluoride	4	2	2,250	3	3	1,900
Arsenic	Pollutant not reported in the top five 2008 DMR-reported pollutants.			4	1	367
Aluminum	2	2	7,550	5	3	242
Cyanide	5	2	871	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Oil and Gas Category Total	**NA**	**52[b]**	**189,000**	**NA**	**63[b]**	**238,000**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.

[a] 2008 and 2009 DMR data include major and minor dischargers.

[b] Number of facilities reporting TWPE greater than zero.

16.3 Oil and Gas Category Sulfide Discharges in DMR

Table 16-3 presents the three facilities that have sulfide discharges in the 2008 and 2009 DMR databases. The majority (99 percent) of the sulfide TWPE results from discharges from Marathon Oil Maverick Springs in Fremont County, WY. EPA did not review sulfide discharges from the other facilities because they account for only one percent of the Oil and Gas Category's sulfide TWPE.

Table 16-3. Oil and Gas Category Top Sulfide Discharging Facilities in the 2008 and 2009 DMR Databases

Facility Name	Facility Location	2008			2009		
		Pounds of Sulfide Discharged	Sulfide TWPE	Percentage of Oil and Gas Category Sulfide 2009 DMR TWPE	Pounds of Sulfide Discharged	Sulfide TWPE	Percentage of Oil and Gas Category Sulfide 2009 DMR TWPE
Marathon Oil Maverick Springs	Fremont County, WY	60,600	169,800	99%	79,700	223,200	99%
Soap Creek Oil Field	St. Xavier, MT	107	300	< 1%	130	400	< 1%
Petro Gas Liquids Processing	Corpus Christi, TX	5.79	16	< 1%	4	12	<1%
Total		**60,700**	**170,000**	**100%**	**79,800**	**224,000**	**100%**

Sources: DMRLoads2008_v2 and DMRLoads2009_v2.

The Marathon Oil Maverick Springs facility is an oil production facility, located within the exterior boundaries of the Wind River Indian Reservation. The facility's permit fact sheet indicates that the Wyoming Department of Environmental Conservation (WDEQ) developed the permit limits based on Subparts C ("Onshore Subcategory") and E ("Agricultural and Wildlife Water Use Subcategory" of the Oil and Gas Category (WDEQ, 2007). See Section 10.1.2 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* for a complete review of the Oil and Gas Category ELGs (U.S. EPA, 2011). The ELGs and the facility's permit do not set numerical limits for sulfide; however, the permit requires semi-annual effluent monitoring requirements for sulfide. Table 16-4 presents the sulfide concentration data for Marathon Oil Maverick Springs for 2007 through 2009.

Table 16-4. Marathon Oil Maverick Springs's Outfall 001 2007 Through 2009 Sulfide Discharge Data

Monitoring Period Date	Maximum Concentration (mg/L)	Flow (MGD)
31-Dec-07	9.76	1.645
31-Dec-08	24	1.645
30-June-09	25	1.598
31-Dec-09	8	1.576

Source: EPA's Envirofacts and DMR Loadings Tool.

EPA contacted Marathon Oil Maverick Springs to verify the 2008 sulfide discharges as part of the 2010 Annual Reviews. The facility confirmed the 2008 sulfide concentrations and flows for outfall 001, a stormwater discharge (Taylor, 2010). EPA also contacted the Wyoming Department of Environmental Quality (WDEQ), the permitting authority, to determine the impact of sulfide concentrations on the receiving stream. The permitting authority confirmed that there were no issues with the sulfide concentrations affecting the receiving stream (WDEQ, 2007). The WDEQ contact further established that water discharges from crude refiners vary with geographic location, implying that the Maverick Spring discharge differs from refiners in other basins.

As a result, EPA concluded that the state is aware of Marathon Oil Maverick Springs' sulfide discharges, and that their sulfide wastewater discharges are unique. That is, the magnitude of their sulfide discharges does not mean that discharges from other facilities in the category would contain such sulfide levels. Because the 2009 sulfide discharges and flow are of the same order of magnitude, as shown in Table 16-4, EPA did not contact the facility to verify the 2009 data. EPA continues to conclude that the facility's sulfide discharges are best controlled by facility-specific permitting support. For more information on the 2008 sulfide discharges from Marathon Oil Maverick Springs, see Section 10.4 of the *Technical Support Document for the 2010 Effluent Guidelines Program Plan* (U.S. EPA, 2011).

16.4 Oil and Gas Category Conclusions

The estimated toxicity of the Oil and Gas Category discharges results mainly from the sulfide discharges of Marathon Oil Maverick Springs (accounting for 99 percent of the category's 2009 TWPE). EPA does not believe that these sulfide discharges are representative of the Oil and Gas Category. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- EPA contacted Marathon Oil Maverick Springs in 2010 because of their sulfide discharges. Marathon Oil Maverick Springs confirmed the 2008 sulfide concentrations and flows. The 2009 sulfide discharges and flows are the same order of magnitude as the 2008 data. Therefore, EPA believes that the 2009 discharge estimates are valid but do not represent the category as a whole. Marathon Oil's sulfide discharges are best controlled by facility-specific permitting support.

- The total 2009 TWPE excluding the sulfide discharges from Marathon Oil Maverick Springs is 14,800. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

16.5 Oil and Gas Category References

1. Taylor, Linda. 2010. Notes From Telephone Conversation Between Linda Taylor, Marathon Oil Maverick Springs, and Elizabeth Sabol, Eastern Research Group, Inc., Re: Sulfide Discharges Reported to DMR in 2008. (June 3). EPA-HQ-OW-2008-0517 DCN 07307.

2. WDEQ. 2007. Wyoming Department of Environmental Quality. State of Wyoming National Pollutant Discharge Elimination System Statement of Basis NPDES WY0000779—Marathon Oil Maverick Springs. Fremont County, WY. (June) EPA-HQ-OW-2008-0517 DCN 07292.

3. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. Washington, D.C. (December). EPA-821-R-06-018. EPA-HQ-OW-2004-0032-2782.

4. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA 820-R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

5. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

17. ORE MINING AND DRESSING (40 CFR PART 440)

EPA selected the Ore Mining and Dressing (Ore Mining) Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. EPA conducted a preliminary study of this category as part of the 2009 and 2010 Annual Reviews (U.S. EPA, 2009, 2011). EPA also reviewed discharges from the Ore Mining Category as part of the 2004 through 2008 Annual Reviews (U.S. EPA, 2004, 2005, 2006, 2007, 2008). This section summarizes the results of the 2011 Annual Reviews associated with the Ore Mining and Dressing Category.

17.1 Ore Mining and Dressing Category 2011 Toxicity Rankings Analysis

Table 17-1 compares the toxicity rankings database results for the Ore Mining Category from the 2006 through 2011 reviews. Both the Toxics Release Inventory (TRI) and discharge monitoring report (DMR) TWPE decreased from 2008 to 2009. The estimated 2009 DMR TWPE accounts for 67 percent of the combined 2009 DMR and TRI TWPE category, similar to previous years. EPA's review of the Ore Mining Category focused on the 2009 DMR discharges because the 2009 DMR data account for 67 percent of the 2009 combined category TWPE.

Table 17-1. Ore Mining Category TRI and DMR Discharges for 2002 Through 2009

Year of Discharge	Year of Review	Ore Mining Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	77,600	410,000	488,000
2004	2007	88,000	581,000	669,000
2005	2008	76,700	NA	NA
2007	2009	39,400	184,000	223,000
2008	2010	109,000	339,000	448,000
2009	2011	68,900	139,000	208,000

Sources: PCSLoads2002_v4; TRIReleases2002_v4; TRIReleases2003_v2; PCSLoads2004_v4; TRIReleases2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

17.2 Ore Mining and Dressing Category Top Facilities in DMR

In EPA's preliminary study of the Ore Mining Category, conducted during the 2009 and 2010 Annual Reviews, EPA determined that approximately two percent of ore mining facilities in the 2007 DMR database have DMR data; see Table 2-2 in the *Ore Mining and Dressing Preliminary Study Report* (U.S. EPA, 2011). Table 17-2 presents counts of the 2009 ore mining facilities in the DMR database. There are 80 ore mining facilities with DMR data in the 2009 DMR database, which accounts for less than four percent of all the facilities in the database.

Table 17-2. Summary of 2009 Ore Mining Facilities With Data in the DMR Database

ELG Subpart	SIC Code and Description	Facilities by Type of Discharger			Number of Facilities With DMR Data
		Major	Minor	All	
A	1011: Iron Ores	5	26	31	6
J	1021: Copper Ores	11	19	30	6
J	1031: Lead/Zinc Ores	24	17	41	21
J, M	1041: Gold Ores	13	2,028	2,041	24
J	1044: Silver Ores	2	29	31	4
J	1061: Ferroalloy Ores (Except Vanadium)	5	7	12	5
NA	1081: Metal Mining Services	0	4	4	1
C	1094: Uranium, Radium, Vanadium Ores	7	28	35	5
Others[a]	1099: Metal Ores, NEC	4	23	27	8
Total		**71**	**2,181**	**2,252**	**80**

Source: DMRLoads2009_v2.

[a] The other subparts include B, D, E, F, G, H, I, and K.

NEC: Not elsewhere classified.

In addition to the findings mentioned above, EPA analyzed specific pollutant discharges and determined that only a small percentage of active mines account for the majority of category's TWPE (U.S. EPA, 2011). Table 17-3 shows the top 14 mines in the 2009 DMR database and their corresponding 2009 TRI discharges. EPA's review showed that the majority of the top 14 mines were reviewed in the Ore Mining Preliminary Study. For a listing of the top mines in the preliminary study, see Table 6-1 in the *Ore Mining and Dressing Preliminary Study Report* (U.S. EPA, 2011). In addition, EPA's review showed that the majority of the pollutants and loads were the same as those reviewed in the Ore Mining Preliminary Study.

Because the discharge data from these mines was consistent with the data from the Preliminary Study, EPA draws a similar conclusion. As shown in Table 17-3, these 14 top mines represent less than one percent of the total number of ore mining facilities (from Table 17-2) and almost 80 percent of the category's 2009 combined TWPE. They differ in location and mine type, showing no trend toward a particular type of mine. Given that a small percentage of active mines account for the majority of category's TWPE, as in the 2010 preliminary study findings, EPA determined that high TWPE discharges are best addressed through facility-specific permitting, compliance, and enforcement support rather than by a revision of 40 CFR Part 440 (U.S. EPA, 2009).

Table 17-3. Top Facility Discharges in the 2009 DMR and TRI Databases[a]

Facility Name	Facility Location	Mine Type[b]	TWPE: Facility Total DMR TWPE	TWPE: Facility Total TRI TWPE	TWPE: Facility Total TWPE	Total Percentage of Ore Mining and Dressing Category's 2009 TWPE
Teck-Pogo Inc.	Delta Junction, AK	Gold ores	33,000	NR	33,000	15.9%
Climax Mine	Climax, CO	Ferroalloy ores (except vanadium)	28,500	NR	28,500	13.7%
Kennecott Copper Co.	Magna, UT	Copper ores	19,800	15,600	35,400	17.0%
Doe Run, Viburnum Mine #35	Viburnum, MO	Lead/zinc ores	12,400	NR	12,400	6.0%
Doe Run, Fletcher Mine/MI	Viburnum, MO	Lead/zinc ores	11,300	9,610	20,910	10.1%
Doe Run, Viburnum Div	Viburnum, MO	Lead/zinc ores	7,370	NR	7,370	3.5%
Doe Run, Brushy Cr Mine/M	Viburnum, MO	Lead/zinc ores	4,780	4,560	9,340	4.5%
Balmat Mines & Mill	Gouverneur, NY	Lead/zinc ores	4,530	709	5,240	2.5%
Mammoth, Sutro, Keystone Et Al	Redding, CA	Copper ores	2,150	NR	2,150	1.0%
Alcoa Arkansas Remediation	Bauxite, AR	Metal ores, NEC	1,960	NR	1,960	0.9%
Homestake Mining Company	Lead, SD	Gold ores	1,720	NR	1,720	0.8%
Northshore Mining/Silver Bay	Silver Bay, MN	Iron ores	1,700	NR	1,700	0.8%
Anschutz—Madison Mine	Fredericktown, MO	Lead/zinc ores	1,510	NR	1,510	0.7%
Doe Run, West Fork Unit	Bunker, MO	Lead/zinc ores	1,330	NR	1,330	0.6%
Remaining facilities with Ore Mining Category discharges[c]	NA	NA	7,110	38,400	45,500	21.9%
Total		**NA**	**139,000**	**68,900**	**208,000**	**100%**

Source: DMRLoads2009_v2 and TRIReleases2009_v2.

[a] The 2009 DMR data includes both major and minor dischargers.

[b] Mine type was based on the SIC code the facility reported.

[c] There are 62 remaining facilities with ore mining discharges that account for approximately 22 percent of the category's 2009 combined TWPE.

NA: Not applicable.

NR: Not reported. Facility does not have discharges in TRI.

NEC: Not elsewhere classified.

17.3 Ore Mining and Dressing Category Conclusions

The estimated toxicity of the Ore Mining Category discharges results mainly from less than 1 percent of ore mines (accounting for almost 79 percent of the category's 2009 combined TWPE). Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from the 2010 preliminary study. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- Over 78 percent of the category's 2009 combined category TWPE is from discharges from 14 facilities. These facilities are varied in location and mine type.
- EPA determined that these facilities are best managed through facility-specific permitting, compliance, and enforcement support.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(2)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

17.4 Ore Mining and Dressing Category References

1. U.S. EPA. 2004 *Technical Support Document for the 2004 Effluent Guidelines Program Plan.* Washington, D.C. (August). EPA 821-R-04-014. EPA-HQ-OW-2003-0074-1346 through 1352.

2. U.S. EPA. 2005. *Preliminary 2005 Review of Prioritized Categories of Industrial Dischargers*. Washington, D.C. (August). EPA-821-B-05-004. EPA-HQ-OW-2004-0032-0053.

3. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan*. Washington, D.C. (December). EPA-821-R-06-018. EPA-HQ-OW-2004-0032-2782.

4. U.S. EPA. 2007. *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan.* Washington, D.C. (October). EPA 821-R-07-007. EPA-HQ-OW-2006-0771-0819.

5. U.S. EPA. 2008. *Technical Support Document for the 2008 Effluent Guidelines Program Plan.* Washington, D.C. (August). EPA 821-R-08-015. EPA-HQ-OW-2006-0771-1701.

6. U.S. EPA. 2009. *Technical Support Document for the Preliminary 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA-821-R-09-006. EPA-HQ-OW-2008-0517-0515.

7. U.S. EPA. 2011. *Ore Mining and Dressing Preliminary Study Report*. Washington, D.C. (December). EPA-821-R-08-012. EPA-HQ-OW-2008-0517 DCN 07369.

8. U.S. EPA. 2011. *Technical Support Document for the 2010 Effluent Guidelines Program Plan*. Washington, D.C. (October). EPA 820-R-10-021. EPA-HQ-OW-2008-0517 DCN 07320.

9. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

18. PESTICIDE CHEMICALS (40 CFR PART 455)

EPA selected the Pesticide Chemicals Category for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. EPA reviewed discharges from the Pesticide Chemicals Category as part of the 2005, 2006, and 2007 Annual Reviews (U.S. EPA, 2005, 2006, 2007). This section summarizes the results of the 2011 Annual Reviews associated with the Pesticide Chemicals Category. EPA focused on discharges of polychlorinated biphenyls (PCBs) from one facility due to its high TWPE relative to the other facilities in the Pesticide Chemicals Category.

18.1 Pesticide Chemicals Category 2011 Toxicity Rankings Analysis

Table 18-1 compares the toxicity rankings analysis results for the Pesticide Chemicals Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring report (DMR) and Toxics Release Inventory (TRI) databases decreased from discharge years 2002 to 2009. The estimated 2009 TRI TWPE accounts for approximately 78 percent of the combined 2009 DMR and TRI TWPE, as in the 2002 and 2004 discharge years.

Table 18-1. Pesticide Chemicals Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Pesticide Chemicals Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	554,000	50,300	605,000
2004	2007	518,000	102,000	621,000
2005	2008	31,400	NA	NA
2007	2009	24,700	180,000	205,000
2008	2010	35,500	81,500	117,000
2009	2011	35,700	10,000	45,700

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

18.2 Pesticide Chemicals Category Pollutants of Concern

EPA's review of the Pesticide Chemicals Category focused on the 2009 TRI discharges because the 2009 TRI data dominate the category's combined TWPE. Table 18-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 Annual Reviews (*TRIReleases2009_v2* and *TRIReleases2008_v3*, respectively).

PCB is the top TRI-reported pollutant in 2009, contributing more than 36 percent of the 2009 TRI category TWPE. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews.

Table 18-2. Pesticide Chemicals Category Top TRI Pollutants

Pollutant	2008 TRI Data			2009 TRI Data		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
PCBs	Pollutant not reported in the top five 2008 TRI-reported pollutants.			1	1	13,000
Dichlorvos	2	1	6,930	2	1	6,930
Diazinon	4	4	3,110	3	2	3,330
Carbaryl	5	5	2,800	4	2	2,800
Dioxin and dioxin-like compounds	Pollutant not reported in the top five 2008-TRI reported pollutants.			5	1	1,440
Bifenthrin	1	2	12,700	Pollutant not reported in the top five 2009 TRI-reported pollutants.		
Dinitrobutyl phenol	3	3	3,370			
Pesticide Chemicals Category Total	**NA**	**73[a]**	**35,500**	**NA**	**62[a]**	**35,700**

Sources: *TRIReleases2008_v3* and *TRIReleases2009_v2*.

[a] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

18.3 Pesticide Chemicals Category PCB Discharges in TRI

GB Biosciences Corp. in Houston, TX, manufactures chlorophenol in a process that creates PCBs as a byproduct (King, 2011). The facility accounts for all of the Pesticide Chemicals Category's PCB discharges in the 2009 TRI database. Table 18-3 presents GB Biosciences' PCB discharges for 2003 through 2010; note that the 2009 discharges are three orders of magnitude larger than previous years' discharges.

Table 18-3. 2003–2010 GB Biosciences Corp. TRI PCB Discharges

Year	Total PCB Pounds Released	Total PCB TWPE
2003	0.0004	13.6
2004	0.001	34.0
2005	0.0004	13.6
2006	0.0006	20.4
2007	0.0008	27.2
2008	0.0008	27.2
2009	0.382	13,000
2010[a]	0.000765	26.0

Sources: Envirofacts; TRIReleases2002_v4; TRIReleases2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; TRIReleases2008_v3; and TRIReleases2009_v2.

[a] 2010 data were pulled from Envirofacts.

As part of the 2011 Annual Reviews, EPA contacted GB Biosciences about its PCB discharge in the 2009 TRI. The facility contact identified a reporting error: the 0.382 pounds reported to TRI should have been reported as 0.382 grams.

In addition, the facility had estimated its PCB discharges in 2009 TRI using results from sampling by the University of Houston, done as part of the Texas Commission on Environmental Quality's (TCEQ's) PCB total maximum daily load (TMDL) development for the Houston Ship Channel and Upper Galveston Bay.[11] All of the facility's 2009 PCB sample concentrations were below detection limits, which is consistent with its previous and 2010 results. (The facility has detected PCBs in its sludge, which it disposes of offsite.) However, the University of Houston measured 0.71 nanograms per liter (ng/L) of PCBs in a sample of the facility's wastewater. The facility used the 0.71 ng/L result and the 2009 flow rate to calculate its 2009 TRI PCB discharges. The facility contact suspected that the University of Houston's PCBs results differ from the facility's because of method variations (King, 2011).

As a result, EPA determined that the reported 2009 TRI discharge from GB Biosciences overestimates the actual discharge. The facility used the sampling result from the TMDL study and did not factor in the non-detect values measured throughout the year. Because all of the

[11] TCEQ began developing the TMDL for PCBs as a result of seafood consumption advisories for various species of fish, issued by the Texas Department of State Health Services after PCBs were detected in the fish tissue beginning in 2001 (HGAC, 2011; TCEQ, 2010). TCEQ analyzed effluent samples from 20 different sampling sites in 2009 around the Houston Ship Channel and Galveston Bay areas. GB Biosciences was the only pesticide manufacturing facility sampled (Parsons, 2009). TCEQ reported the effluent PCB concentration from GB Biosciences to be between 0.136 and 0.300 ng/L. Other facilities included in the TMDL development sampling had effluent PCB concentrations between 0.136 and 3.214 ng/L (Parsons, 2010).

facility's 2009 data are non-detect, EPA is zeroing the PCB TWPE for GB Biosciences. Additionally, the TMDL study will ensure that any actual PCB discharges are controlled sufficiently. Correcting this discharge will result in the total category TWPE decreasing from 45,700 to 32,700.

18.4 Pesticide Chemicals Category Conclusions

The estimated toxicity of the Pesticide Chemicals Category discharges results mainly from the PCB discharges of one facility (accounting for 28 percent of the category's 2009 combined TWPE). Using data collected for the 2011 Annual Reviews, EPA concludes the following:

One facility, GB Biosciences, accounts for all of the 2009 TRI PCB discharges. The facility reported the TRI PCB discharges in grams instead of pounds. Additionally, the facility used a sample collected by the University of Houston as part of the TCEQ TMDL study to calculate its 2009 PCB discharges as reported to TRI. However, the facility has a long history of testing for PCBs and finding concentrations below levels of detection (King, 2011). EPA determined that the 2009 TRI discharge for GB Biosciences overestimates the actual discharge and zeroed the facility's PCB discharges for toxicity ranking purposes.

The total 2009 category TWPE after correcting the units and amount of the PCB discharge from GB Biosciences is 32,700. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

18.5 Pesticide Chemicals Category References

1. HGAC. 2011. Houston-Galveston Area Council. Houston Ship Channel and Upper Galveston Bay: TMDL Project for Dioxin and Polychlorinated Biphenyls (PCBs) in Fish Tissue. (April 14). EPA-HQ-OW-2010-0824. DCN 07612.

2. King, Stephanie. 2011. Telephone Communication Between Stephanie King, GB Biosciences, and Kimberly Landick, Eastern Research Group, Inc., Re: 2009 TRI PCB Discharges. (May 10). EPA-HQ-OW-2010-0824. DCN 07613.

3. Parsons. 2009. *Total Maximum Daily Load for PCBs in the Houston Ship Channel.* University of Houston. (July 14). EPA-HQ-OW-2010-0824. DCN 07614.

4. Parsons. 2010. Total Maximum Daily Load for PCBs in the Houston Ship Channel + Survey and Snapshot of PCBs and Dioxin in the Houston Ship Channel and Galveston Bay System. University of Houston. (June 23). EPA-HQ-OW-2010-0824. DCN 07615.

5. TCEQ. 2010. Texas Commission on Environmental Quality, Total Maximum Daily Load Program. *Improving Water Quality in the Houston Ship Channel and Galveston Bay, Thirteen TMDLs for PCBs.* (March). EPA-HQ-OW-2010-0824. DCN 07616.

6. U.S. EPA. 2005. *Preliminary 2005 Review of Prioritized Categories of Industrial Dischargers.* Washington, D.C. (August). EPA-821-B-05-004. EPA-HQ-OW-2004-0032-0053.

7. U.S. EPA. 2006. *Technical Support Document for the 2006 Effluent Guidelines Program Plan.* Washington, D.C. (December). EPA-821-R-06-018. EPA-HQ-OW-2004-0032-2782.

8. U.S. EPA. 2007. *Technical Support Document for the Preliminary 2008 Effluent Guidelines Program Plan.* Washington, D.C. (October). EPA-821-R-07-007. EPA-HQ-OW-2006-0771-0819.

9. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

19. PETROLEUM REFINING (40 CFR PART 419)

EPA selected the Petroleum Refining Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalent (TWPE), in the point source category rankings. EPA reviewed discharges from the Petroleum Refining Category as part of the 2004–2009 Annual Reviews (U.S. EPA, 2004, 2005, 2006, 2007, 2008, 2009). EPA also conducted a detailed study of this industry in support of the 2004 Final Effluent Guidelines Program Plan (U.S. EPA, 2004). This section describes the results of EPA's 2011 preliminary category review of the Petroleum Refining Category. The review focused on discharges of dioxin and dioxin-like compounds and polycyclic aromatic compounds (PACs) from the Toxics Release Inventory (TRI) and sulfide, chlorine, and metals discharges from discharge monitoring reports (DMR), because of their high TWPE relative to other pollutants in the Petroleum Refining Category.

19.1 Petroleum Refining Category 2011 Toxicity Rankings Analysis

Table 19-1 compares the toxicity rankings analysis results for the Petroleum Refining Category from the 2007 through 2011 Annual Reviews. The combined TWPE from discharges in the DMR and TRI databases decreased from discharge years 2004 to 2007, increased from 2007 to 2008, and then decreased from 2008 to 2009. The estimated 2009 TRI TWPE accounts for approximately 60 percent of the combined 2009 DMR and TRI TWPE.

Table 19-1. Petroleum Refining Category TRI and DMR Discharges for 2007 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Petroleum Refining Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2004	2007	669,000	819,000	1,490,000
2005	2008	628,000	NA	NA
2007	2009	172,000	403,000	575,000
2008	2010	410,000	680,000	1,090,000
2009	2011	436,000	295,000	731,000

Sources: TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to publicly owned treatment works (POTWs) and account for POTW removals.

[b] DMR data from 2004 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

19.2 Petroleum Refining Category Pollutants of Concern

EPA's review of the Petroleum Refining Category focused on the 2009 TRI and DMR discharges because the category's combined TWPE is not dominated by either the 2009 TRI or DMR data. Table 19-2 lists the five pollutants with the highest TWPE in *TRIReleases2008_v3* and *TRIReleases2009_v2*. Table 19-3 lists the five pollutants with the highest TWPE in *DMRLoads2007_v3* and *DMRLoads2009_v2*. The top TRI pollutant, dioxin and dioxin-like compounds, contributes more than 72 percent of the total TRI TWPE. The top DMR pollutants, sulfide and chlorine, contribute more than 61 percent of the total DMR TWPE.

Table 19-2. Petroleum Refining Category Top TRI Pollutants

Pollutant	2008[a]			2009[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Dioxin and dioxin-like compounds	1	20	300,000	1	19	315,000
Polycyclic aromatic compounds	2	62	33,700	2	63	35,000
Mercury and mercury compounds	3	62	18,800	3	68	22,600
Lead and lead compounds	5	107	11,300	4	113	16,700
Nitrate compounds	4	65	18,200	5	66	14,600
Petroleum Refining Category Total	**NA**	**298[b]**	**410,000**	**NA**	**280[b]**	**436,000**

Sources: TRIReleases2008_v3 and TRIReleases2009_v2.
[a] Discharges include transfers to POTWs and account for POTW removals.
[b] Number of facilities reporting TWPE greater than zero.

Table 19-3. Petroleum Refining Category Top DMR Pollutants

Pollutant	2008			2009		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Sulfide	1	77	203,000	1	73	136,000
Chlorine	3	22	132,000	2	23	45,700
Chloride	4	15	39,000	3	14	16,800
Aluminum	Pollutants not reported in the top five 2008 DMR-reported pollutants.			4	12	14,200
Selenium				5	23	12,200
Benzene	2	86	150,000	Pollutants not reported in the top five 2009 DMR-reported pollutants.		
Toluene	5	55	31,900			
Petroleum Refining Category Total	**NA**	**248[a]**	**680,000**	**NA**	**249[a]**	**295,000**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.
[a] Number of facilities reporting TWPE greater than zero.
NA: Not applicable.

The following subsections discuss EPA's additional review for the 2009 TRI and DMR database pollutants of concern: dioxin and dioxin-like compounds, sulfide, chlorine, and metals. EPA also reviewed the TRI PAC discharges and confirmed that there is little evidence that PACs are being discharged to surface waters in concentrations above the detection limit, previously concluded during the 2004 Annual Reviews (U.S. EPA, 2004). EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews.

19.3 Petroleum Refining Category Dioxin and Dioxin-Like Compound Discharges in TRI

Dioxin and dioxin-like compounds contribute 72 percent of the total 2009 TRI TWPE and increased by approximately 15,000 TWPE from reporting years 2008 to 2009. EPA previously determined that refineries produce dioxin and dioxin-like compounds during catalytic reforming and catalyst regeneration operations (U.S. EPA, 2004). Table 19-4 summarizes the number of facilities and total TWPE for discharge years 2004 through 2009 and demonstrates the large increase in estimated TWPE. Table 19-15, at the end of this section, presents the petroleum refineries that reported dioxin and dioxin-like compound discharges to TRI in 2009 and shows that the majority of this increase results from a single facility.

Table 19-5 summarizes the 2009 basis of estimates reported by the 19 refineries discharging dioxin in 2009 by type of estimate. Of the 19 refineries reporting dioxin and dioxin-like compound discharges to TRI in 2009, only nine of these refineries reported dioxin discharges based on analytical measurements, the other refineries never measured for dioxin and dioxin-like compounds.

Table 19-4. Summary of Dioxin and Dioxin-Like Compound Discharges, 2004–2009

	Year of Discharge				
	2009	**2008**	**2007**	**2005**	**2004**
Number of facilities	19	20	9	15	17
Total TWPE	315,000	300,000	94,500	516,000	559,000

Sources: TRIReleases2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; TRIReleases2008_v3; and TRIReleases2009_v2.

Table 19-5. Basis of Estimate Summary for 2009 Dioxin and Dioxin-Like Compound Discharges

	Basis of Estimate			
	M1 or M2	**C**	**E1 or E2**	**O**
Number of facilities	9	2	3	5

Source: *TRIReleases2009_v2*.

M1: continuous monitoring data or measurements

M2: periodic or random monitoring data or measurements

C: mass balance calculations, such as calculation of the amount of the toxic chemical in streams entering and leaving process equipment

E1: published emission factors

E2: site-specific emission factors

O: other approaches, such as engineering calculations

Hovensa LLC in Christiansted, VI, accounts for 65 percent of the category's dioxin and dioxin-like compound discharges in *TRIReleases2009_v03*. As part of the 2011 Annual Reviews, EPA contacted the facility about its dioxin and dioxin-like compound discharges. The facility contact stated that the dioxin discharges are estimated using literature values associated with dioxin formation from reformer catalyst regeneration. The facility indicated that the increase in dioxin discharges from 2008 to 2009, shown in Table 19-15, was due to the number of times the facility regenerated the reformer catalyst, once in 2008 compared to three times in 2009. The facility contact stated that the number of regenerations required in a given year could vary between zero and three, depending on different operating factors (Vernon, 2011). The facility used the dioxin distributions given in the *Dioxins and Refineries: Analysis in the San Francisco Bay Area* report (CBE, 2000) to estimate the dioxin load and distribution, presented in Table 19-6. The source of these dioxin distributions is the 1996 EPA Preliminary Data Summary for the Petroleum Refining Category.

Table 19-6. Bay Area Refineries Reformer Water Results[a]

Dioxin Congener	TWF	Chevron Richmond		Tosco Avon		Tosco Rodeo[b]	
		Concentration (pg/L)	Distribution (%)	Concentration (pg/L)	Distribution (%)	Concentration (pg/L)	Distribution (%)
2,3,7,8- TCDD	703,584,000	170	0.206	BD	0	22	0.289
1,2,3,7,8-PeCDD	692,928,000	730	0.886	BD	0	85	1.12
1,2,3,4,7,8-HxCDD	23,498,240	740	0.898	8,700	0.39	90	1.18
1,2,3,6,7,8-HxCDD	9,556,480	920	1.12	15,700	0.703	90	1.18
1,2,3,7,8,9-HxCDD	10,595,840	440	0.534	16,900	0.757	190	2.5
1,2,3,4,6,7,8-HpCDD	411,136	2,640	3.2	55,900	2.5	890	11.7
OCDD	6,586	1,170	1.42	68,400	3.06	1,400	18.4
2,3,7,8-TCDF	43,819,554	3,350	4.07	5,300	0.237	150	1.97
1,2,3,7,8-PeCDF	7,632,640	9,150	11.1	44,000	1.97	120	1.58
2,3,4,7,8-PeCDF	557,312,000	4,600	5.58	111,500	4.99	180	2.37
1,2,3,4,7,8-HxCDF	5,760,000	14,700	17.8	128,500	5.76	340	4.47
1,2,3,6,7,8-HxCDF	14,109,440	5,800	7.04	131,000	5.87	240	3.15
2,3,4,6,7,8-HxCDF	47,308,800	1,320	1.6	25,000	1.12	190	2.5
1,2,3,7,8,9-HxCDF	51,204,160	1,700	2.06	177,000	7.93	230	3.02
1,2,3,4,6,7,8-HpCDF	85,760	17,200	20.9	599,000	26.8	970	12.8
1,2,3,4,7,8,9-HpCDF	3,033,984	7,500	9.1	566,000	25.4	520	6.84
OCDF	2,021	10,250	12.4	279,500	12.5	1,900	25
Total TWF			**45,900,000**		**34,900,000**		**28,300,000**

Source: *Dioxins and Refineries* report (CBE, 2000).

[a] Dioxin sampling occurred on wastewater directly exiting the reformer catalyst regenerators.

[b] Tosco Rodeo is now ConocoPhillips Rodeo.

BD: Below detection.

As new data becomes available, EPA will review dioxin discharges for the Petroleum Refining Category to determine if the same conclusions apply.

19.4 Petroleum Refining Category PAC Discharges in TRI

PACs discharges contribute 8 percent of the total 2009 TRI TWPE and increased by approximately 1,300 TWPE from reporting years 2008 to 2009. Table 19-16, presented at the end of this section, lists the petroleum refineries that reported PACs to TRI in 2009. Exxon Mobil Oil Corp.'s Joliet Refinery in Channahon, IL, contributed 26 percent of the PAC discharges for TRI 2009. Table 19-7 presents the total PAC discharges from years 2004 through 2009, which have remained consistent.

Table 19-7. Total TRI PACs Discharges for Years 2004–2009

	2009	2008	2007	2005	2004
TWPE	35,000	33,700	31,000	34,300	26,100

Sources: TRIReleases2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; TRIReleases2008_v3; and TRIReleases2009_v2.

EPA examined PAC discharges from petroleum refineries extensively for its previous detailed and preliminary category reviews. From these previous studies, EPA concluded that the petroleum refinery PAC discharges reported to TRI are either (1) based on half the detection limit multiplied by the flow or (2) estimated using emission factors.

Therefore, there is little evidence that PACs are being discharged to surface waters in concentrations above the detection limit (U.S. EPA, 2004). As shown in Table 19-7, the TWPE is consistent from discharge year 2004 to 2009 and, therefore, EPA's previous conclusions from the detailed study are still accurate.

19.5 Petroleum Refining Category Sulfide Discharges in DMR

Sulfide discharges in the 2009 DMR database account for 46 percent of the category's total DMR TWPE. Table 19-8 presents the top sulfide dischargers in the 2009 DMR database. The majority (54 percent) of the sulfide discharges are from four facilities; EPA focused the further review of the category's sulfide discharges on these facilities.

Table 19-8. Petroleum Refining Category Sulfide Dischargers in the 2009 DMR Database

Facility Name	Location	Sulfide Pounds Discharged	Sulfide TWPE	Facility Percent of Sulfide Category TWPE
Beaumont Refinery	Beaumont, TX	15,900	44,400	32%
Texas City Refinery	Texas City, TX	4,270	12,000	9%
Exxon Company USA Baton Rouge	Baton Rouge, LA	3,710	10,400	8%

Table 19-8. Petroleum Refining Category Sulfide Dischargers in the 2009 DMR Database

Facility Name	Location	Sulfide Pounds Discharged	Sulfide TWPE	Facility Percent of Sulfide Category TWPE
Citgo Petroleum Corporation	Lake Charles, LA	2,490	6,980	5%
Remaining facilities reporting sulfide discharges[a]		22,300	62,600	46%
Total		**48,700**	**136,000**	**100%**

Source: DMRLoads2009_v2.

[a] There are 69 remaining facilities that have sulfide discharges in the 2009 DMR database, which account for 46 percent of the category's sulfide DMR TWPE.

Sulfide is an anion of sulfur in its lowest oxidation state of minus 2 (S^{2-}). The dianion S^{2-} exists only in strongly alkaline aqueous solutions. Such solutions can form by dissolution of H_2S or alkali metals such as lithium sulfide, sodium sulfide, and potassium sulfide in the presence of excess hydroxide ions. The ion S^{2-} is exceptionally basic, with an acid dissociation constant (pK_a) greater than 14. Sulfide does not exist in appreciable concentrations even in highly alkaline water. Instead, sulfide combines with protons to form HS^-, which is variously called H_2S ion. At still lower pH values (<7), HS^- converts to H_2S, as shown by the equation below. At a pH of 5, nearly 100 percent of sulfide is present as H_2S.

$$H_2S \Leftrightarrow HS^- + H^+ \text{ and } HS^- \Leftrightarrow S^- + H^+ \qquad \text{(Eq. 19-1)}$$

Sulfides are moderately strong reducing agents. They react with oxygen in the air in elevated temperatures to form higher-valence sulfur salts, such as sulfates and sulfur dioxide. Aqueous solutions of transition metals cations react with sulfides to precipitate solid metal sulfide salts. The metal sulfide salts typically have very low solubility in water.

Sulfides are constituents of many industrial wastes such as those from tanneries, paper mills, chemical plants, and gas works (U.S. EPA, 1986). Sulfides discharged to neutral receiving waters can be reduced to hydrogen disulfide (H_2S), an extremely toxic, odiferous, and corrosive gas. Minute concentrations (2 micrograms per liter) of H_2S impart an objectionable odor and taste to water, making it unfit for municipal consumption (U.S. EPA, 1974).

The Petroleum Refining Category effluent limitations guideline (ELG) does set limits for sulfide; however, they are production based limits. Therefore, EPA did not compare the ELG production based limits to the concentration and quantity discharges from the top sulfide discharging facilities. Sources of sulfide in the Petroleum Refining Category include crude desalting, crude distillation, and cracking processes (U.S. EPA, 1982).

19.5.1 Sulfide Wastewater Treatment

The following discusses various treatment options for sulfide in industrial wastewaters. Although the options presented below have the ability to remove sulfide from wastewater, the actual effluent concentrations attainable are a function of treatment system design, which is beyond the scope of this section (Briggs, 2011). In addition to wastewater treatment, substituting sulfur dyes in the dyeing processes is another way textile mills can reduce sulfide discharges (U.S. EPA, 1982).

19.5.2 Biological Treatment

Biological treatment, the treatment basis for the BAT limits, treats industrial effluent streams by either aerobic or anaerobic processes (U.S. EPA, 1974). It involves bacteria that stabilize wastes by decomposing them to form harmless inorganic solids (Durai and Rajasimman, 2011).

EPA identified two recent studies on industrial waste with high sulfide concentrations:

- The first study (Camper and Bott, 2006) investigated a viscose rayon plant, where one- and two- stage biological treatment was used for influent with high levels of reduced sulfur compounds (i.e., sulfide) and organic contaminants. The study showed that about 99 percent of the influent sulfide can be biologically oxidized to sulfate. This resulted in effluent sulfide concentrations less than 2.5 mg/L.

- The second study (Durai and Rajasimman, 2011) concerned a tannery. It showed that pretreatment for aerobic units and post-treatment for anaerobic units, including oxidation of sulfide by air using activated carbon as a catalyst, eliminates sulfide in the wastewater effluent.

19.5.3 Aeration and Air Stripping

Aeration is a common method for removal of dissolved gasses such as H_2S. Aeration processes are, generally, used in two types of water applications: air stripping, the process in which gas is removed from water, and aeration, the process in which air or oxygen is transferred to water. Henry's Law describes the tendency of a constituent to transfer from the liquid to the gas phase at equilibrium. The Henry's Law constant is the ratio of the equilibrium concentration of a particular contaminant in air to its concentration in water. Thus, a higher Henry's Law constant indicates a greater tendency of species to volatilize. Compounds with Henry's Law constants above 10 atmospheres per mole fraction are readily air strippable. Because the Henry's Law constant for sulfide ion is very low, it is not published; however, the Henry's Law constant for H_2S is 468 at 20^{o}C, which indicates that sulfide must first be converted to H_2S by the addition of acid to pH 5 or below. High temperature and turbulence promotes gas transfer by reducing thickness of film at air-water interface. The efficiency of aeration depends almost entirely on the amount of surface contact between the air and water. Method of aeration can be classified into four general categories: waterfall, bubble, mechanical, and pressure aeration (Briggs, 2011).

The effectiveness of aeration for removing sulfide depends upon the aeration method selected, the pH of the water (which dictates the applicable Henry's law constant), design factors such as air to water ratio, flow and loading rate, available area of mass transfer, temperature, and algae production. The major drawback to aeration is that H_2S is not destroyed, but is instead transferred to an air emission (Briggs, 2011).

19.5.4 Hydrogen Peroxide Oxidation

Hydrogen peroxide (H_2O_2) controls sulfide by oxidation to either elemental sulfur or sulfate ion depending on the pH of the wastewater. Hydrogen peroxide oxidation of sulfide has been demonstrated at both industrial facilities and municipal wastewater treatment plants. At neutral or slightly acid pH conditions, the product of sulfide oxidation is predominately elemental sulfur, which appears as a yellow colloid (if H_2O_2 is underdosed) or a white colloid (with complete oxidation). Colloidal elemental sulfur can be removed from the wastewater following H_2O_2 oxidation by flocculation with an anionic polymer and filtration. The reaction below shows the oxidation of H_2S to elemental sulfur under neutral or slightly acid conditions (Briggs, 2011).

$$H_2S + H_2O_2 \Rightarrow S_0 + H_2O \qquad \text{(Eq. 19-2)}$$

It is not unusual for system efficiencies to approach 100 percent, particularly when the concentrations of other oxidizable substances (e.g., thiosulfate) are low, and when the reaction is accelerated by a catalyst such as ferric iron. In the presence of enough ferric iron, 99 percent of H_2S can be removed from wastewater (Briggs, 2011). Under alkaline conditions (pH > 9.2), sulfide is converted to sulfate by H_2O_2 as shown by the reaction below.

$$S^{2-} + 4H_2O_2 \Rightarrow SO_4^{2-} + 4H_2O\ H_2O \qquad \text{(Eq. 19-3)}$$

It is not unusual for system efficiencies to approach 100 percent, provided that the H_2O_2 is added in a controlled fashion and the reaction medium is thoroughly mixed. This is due to the faster reaction brought about by the increased reactivity of H_2O_2 at alkaline pH. Consequently, as the pH increases above 9 or 10, there is generally little benefit to catalyzing the reaction. At a pH 9, sulfide can be oxidized to sulfate in 15 minutes. Since sulfate is very soluble in water, no additional wastewater processing (e.g., filtration) is required following peroxide oxidation (Briggs, 2011).

Table 19-9 presents discharge data for the top four facilities discharging sulfide and their permit limits. The majority of discharges for all four facilities are below or near treatable levels (Briggs, 2011). EPA determined that sulfide discharges do not represent a hazard priority at this time.

Table 19-9. Top Sulfide Discharging Facilities

Facility Name	Location	Outfall	Reported Concentration Range (mg/L)	Reported Quantity Range (kg/day)	Flow (MGD)	Permit Limits (lbs/day)
Beaumont Refinery	Beaumont, TX	001	0.02–4.8	NR	11–14	NA
Texas City Refinery	Texas City, TX	001	0–0.05	0–2.93	0–15.44	NA
		005	0–0.05	0–3.73	0–19.96	
		006	0.04–0.10	1.82–3.73	9.79–15.44	NA
Exxon Company USA	Baton Rouge, LA	001	0.044–0.257	2.27–13.2	13.5–14.1	NA
Citgo Petroleum Corporation	Lake Charles, LA	001	0.00624–0.0208	0.10–0.30	1.09–1.92	17.6
		003	0.0262–0.268	3.0–19.0	8.49–11.5	21.8

Source: DMR Loadings Tool.
NR: Not reported.
NA: Not applicable.

19.6 Petroleum Refining Category Chlorine Discharges in DMR

Chlorine discharges in the 2009 DMR database account for 15 percent of the category's total DMR TWPE. Table 19-10 presents the chlorine discharges in the 2009 DMR database. Discharges of chlorine from one facility, Premcor DCR, account for 75 percent of the category's chlorine DMR TWPE. Accordingly, EPA focused its review of chlorine discharges on that facility.

Table 19-10. Petroleum Refining Category Chlorine Dischargers in the 2009 DMR Database

Facility Name	Location	Chlorine Pounds Discharged	Chlorine TWPE	Facility Percent of Chlorine Category TWPE
Premcor DCR	Delaware City, DE	68,700	34,400	75%
Remaining facilities reporting chlorine discharges[a]		22,700	11,400	25%
Total		**91,500**	**45,700**	**100%**

Source: DMRLoads2009_v2.

[a] There are 22 remaining facilities that have chlorine discharges in the 2009 DMR database, which account for 25 percent of the category's chlorine DMR TWPE.

Premcor DCR in Delaware City, DE, discharges chlorine from its outfall 001. Premcor's refinery shut down at the end of 2009 (Valero, 2009). On June 1, 2010, PBF Energy acquired the refinery and it started back up in May 2011 (Seba, 2011). Table 19-11 presents Premcor's 2009 monthly chlorine and flow discharge data from the DMR Loadings Tool. As Table 19-11 shows, three concentrations are above the detection limit; however, the concentration values reported are the same as in months that are below the detection limit (BDL). As a result, EPA suspects that the BDL indicators are missing from these 2009 concentrations. With a BDL indicator added for January, February, and April 2009 discharges, the facility's chlorine TWPE decreases to zero.

Table 19-11. Premcor's Outfall 001 2009 Monthly Chlorine and Flow Discharge Data

Monitoring Period Date	DMR Loadings Tool Average Chlorine Discharge (mg/L)	DMR Loadings Tool Average Flow (MGD)
31-Jan-09	0.1	298
28-Feb-09	0.2	299
31-Mar-09	<0.1	241
30-Apr-09	0.1	177
31-May-09	<0.1	356
30-Jun-09	<0.1	409
31-Jul-09	<0.2	419
31-Aug-09	<0.1	403
30-Sep-09	<0.1	391
31-Oct-09	<0.1	316
30-Nov-09	<0.1	270
31-Dec-09	<0.1	106

Source: DMR Loadings Tool.

19.7 Petroleum Refining Category Metals Discharges in DMR

Petroleum refinery wastewater contains a number of metals. The major source of metals in refinery wastewater is crude petroleum. Pipe corrosion, catalyst additives, other refinery raw materials, cooling water biocide, and supply water also contribute metals to refinery wastewater (U.S. EPA, 2004).

Table 19-12 presents the DMR metals discharges from discharge years 2000 to 2009. During the 2004 Annual Reviews, EPA concluded that 10 metals are most commonly found in discharges from petroleum refineries (U.S. EPA, 2004). Table 19-13 lists these metals, along with the number of facilities reporting each metal in 2009 and the total 2009 pollutant TWPE. Table 19-14 presents the top 98 percent of facilities that are discharging metals with the metals they discharged. The Petroleum Refining Category ELG does set limits for chromium; however, they are production based limits. Therefore, EPA did not compare the ELG production based limits to the concentration and quantity discharges from the top chromium discharging facilities.

Table 19-12. DMR Metal Discharges, 2000–2009

	2009	2008	2007	2004	2000
Total Metals TWPE	66,300	56,300	134,000	63,700	33,500

Sources: PCSLoads2000; PCSLoads2004_v3; DMRLoads2007_v4; DMRLoads2008_v3; and DMRLoads2009_v2.

Table 19-13. 2009 Petroleum Refinery Metals DMR Discharges

Metal	2000			2009		
	Number of Facilities Reporting Metals[a]	Number of Facilities Reporting Non-Zero TWPE	Total Metal TWPE	Number of Facilities Reporting Metals[a]	Number of Facilities Reporting Non-Zero TWPE	Total Metal TWPE
Aluminum	7	6	7,830	17	12	14,200
Arsenic	18	10	5,770	46	13	4,560
Chromium	99	61	553	124	54	178
Copper	26	18	712	87	46	4,650
Lead	28	11	1,575	167	47	8,620
Mercury	16	7	1,910	59	21	7,950
Nickel	17	13	480	57	22	448
Selenium	23	18	9,040	52	23	12,200
Vanadium	3	3	1,120	2	2	11,800
Zinc	39	32	1,110	96	54	1,680
Total	**104**	**77**	**30,100**	**253**	**117**	**66, 300**

Source: *PCSLoads2000_v3* and DMR Loadings Tool.

[a] This number includes all facilities reporting metal concentrations.

Table 19-14. 2009 Top Petroleum Refineries Discharging Metals in DMR

Facility Name	Location	Total Metal TWPE	Aluminum	Arsenic	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Vanadium	Zinc
Trainer Oil Refinery	Trainer, PA	15,100	X		X		X			X		X
BP Products Whiting Refinery	Whiting, IN	13,800				X	X	X		X	X	
Suncor Energy (USA) Inc.	Commerce City, CO	7,510		X	X	X	X	X	X	X		X
Sunoco, Inc.	Philadelphia, PA	4,690				X	X					X
Flint Hills Resources LP	Pine Bend, MN	3,780						X		X		
El Segundo Refinery	El Segundo, CA	3,470		X	X	X	X		X	X		X
Motiva Enterprises, LLC	Norco, LA	2,430				X						
Phillips 66 Company, Sweeny	Old Ocean, TX	2,290						X		X		X
Tosco Refinery	Rodeo, CA	1,990	X	X	X	X	X		X	X		X
Ergon–West Virginia Inc.	Newell, WV	1,770		X	X	X						X
Delek Refining, LTD.	Tyler, TX	1,280	X									X
Catlettsburg Refining LLC	Boyd County, KY	1,100	X	X					X			X
ConocoPhillips Company–Lake Charles	Westlake, LA	901				X		X	X			X
Martinez Refinery	Martinez, CA	792			X	X			X	X		X
Valero Memphis Refinery	Memphis, TN	755				X	X					X
Borger Refinery	Borger, TX	488		X	X					X		
The Premcor Refining Group	Port Arthur, TX	443				X	X					
Lion Oil Co	El Dorado, AR	392			X		X			X		X

Source: DMR Loadings Tool.

EPA does not have enough information to determine if the metals discharges present a hazard. EPA intends to collect information on the concentrations of metals in the discharges and to compare these to treatability concentrations in the 2012 planning year.

19.8 Petroleum Refining Category Conclusions

EPA's estimate of the toxicity of Petroleum Refining Category discharges is largely due to the TRI-reported discharges of dioxin and dioxin-like compounds and PACs and DMR-reported discharges of sulfides, chlorine, and metals. Using data collected for the 2011 Annual Reviews, EPA concluded the following:

- EPA previously determined that refineries form dioxin and dioxin-like compounds during catalytic reforming and catalyst regeneration operations. One facility, Hovensa, accounts for 65 percent of the category's dioxin and dioxin-like compound discharges in TRI 2009. The increase in discharge of dioxin and dioxin-like compounds from this facility was due to an increase in the number of catalyst regenerations. To complete its review, EPA requires additional information on other refinery dioxin discharge. EPA will continue to review the remaining dioxin and dioxin-like compound discharges during its 2012 Annual Reviews.

- PAC discharges have remained consistent from 2004 to 2009, so EPA's conclusions from the detailed study still apply. As a result, EPA does not consider these PAC discharges from the Petroleum Refining Category a hazard priority at this time.

- Four facilities account for 54 percent of the DMR sulfide discharges for the Petroleum Refining Category. The majority of discharges for all four facilities are below or near treatable levels. EPA does not consider these sulfide discharges from the Petroleum Refining Category a hazard priority at this time.

- One facility, Premcor, accounts for 75 percent of the DMR chlorine discharges for the Petroleum Refining Category. EPA suspects missing BDL indicators in the data. With this error corrected, the facility TWPE decreases to zero.

- Petroleum refinery wastewater contains a number of metal pollutants. To complete its review, EPA requires additional information to evaluate the discharge hazards associated with metals and will continue reviewing the discharges during its 2012 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(5)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

19.9 <u>Petroleum Refining Category References</u>

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Table 19-15. Dioxin and Dioxin-Like Discharges From Petroleum Refineries Reported to TRI in 2004–2009

			2009			2008			2007			2005			2004		
Facility Name	Location	Comments	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
Hovensa, LLC	Christiansted, VI	No DMR data; TWPE is driving force for 08–09 change in discharge	1.65	205,073	O	0.55	12,848	O	NR	NR	NR	2.2	180,442	E	1.7	148,653	C
Chevron Products Co. Richmond Refinery	Richmond, CA	DMR TWPE is zero; grams is driving force for 08–09 change in discharge	0.25	20,621	M2	0.65	84,423	M2	0.32	33,397	M2	0.94	121,521	M	1.35	141,106	O
Valero Refining Co, Oklahoma Valero Ardmore Refinery	Ardmore, OK	No DMR data; new to report in 2009	0.18053	16,463	C	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Conoco Phillips Co, Billings Refinery	Billings, MT	No DMR data; TWPE is driving force for 08–09 change in discharge	0.08	16,169	M2	0.091	3,125	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevron Products Co. Div of Chevron USA Inc.	El Segundo, CA	DMR TWPE is zero; grams is driving force for 08–09 change in discharge	0.599	13,283	M2	0.8912	81,266	M2	0	0	M2	0.158	16,221	M	0.2	20,533	M
Marathon Ashland Petroleum LLC, Illinois Refining Div	Robinson, IL	No DMR data; grams is driving force for 08–09 change in discharge	0.0404	12,622	M2	0.0405	28,571	O	0.04	1,094	O	0.0404	3,314	O	0.04	3,604	O
Chevron Products Co. Salt Lake City Refinery	Salt Lake City, UT	No DMR data; new to report in 2009	0.097	12,611	E1	NR	NR	NR	0.02	541	M2	NR	NR	NR	NR	NR	NR
Shell Oil Co., Deer Park Refining LP	Deer Park, TX	No DMR data; TWPE is driving force for 08–09 change in discharge	0.1003	8,532	M2	0.1303	3,044	M2	0.14	13,306	M2	0.114	10,850	M	0.16	15,477	M

Table 19-15. Dioxin and Dioxin-Like Discharges From Petroleum Refineries Reported to TRI in 2004–2009

			2009			2008			2007			2005			2004		
Facility Name	**Location**	**Comments**	**Grams Released**	**TWPE**	**Basis of Estimate**	**Grams Released**	**TWPE**	**Basis of Estimate**	**Grams Released**	**TWPE**	**Basis of Estimate**	**Grams Released**	**TWPE**	**Basis of Estimate**	**Grams Released**	**TWPE**	**Basis of Estimate**
Chevron Products Co., Pascagoula Refinery	Pascagoula, MS	No DMR data; grams is driving force for 08–09 change in discharge	0.07265	3,595	O	0.03709	4,592	O	NR	NR	NR	0.099	4,234	O	0.12	5,217	O
Tesoro Refining & Marketing Co	Anacortes, WA	No DMR data; grams is driving force for 08–09 change in discharge	0.41	2.905	M2	0.519	12,124	O	NR	NR	NR	1.94	55,248	M	1.95	54,406	M
Conoco Phillips, San Francisco Refinery	Rodeo, CA	DMR TWPE is zero; grams is driving force for 08–09 change in discharge	0.062320 5	2,276	C	0.16818	15,610	C	NR	NR	NR	NR	NR	NR	NR	NR	NR
BP Products North America Inc, Toledo Refinery	Oregon, OH	DMR TWPE is zero; grams is driving force for 08–09 change in discharge	0.481	785	M2	0.264	6,167	O	0.29	41,963	O	0.331	47,084	O	0.34	47,795	M
Citgo Petroleum Corp	Westlake, LA	No DMR data; TWPE is driving force for 08–09 change in discharge	0.00128	126	E1	0.00257	60	E1	0.002	69	O	0.00256	210	E	0.0026	231	E
Conoco Phillips, Santa Maria Facility Refinery	Arroyo Grande, CA	No DMR data; grams is driving force for 08–09 change in discharge	0.0675	26	M2	0.0133	311	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
BP Products North American Whiting	Whiting, IN	No DMR data; grams is driving force for 08–09 change in discharge	0.000015	8	O	0.000013	12	O	NR	NR	NR	NR	NR	NR	0.000011	1.8	O
Premcor Refining Group, Inc.	Delaware City, DE	No DMR data; new to report in 2009	0.000036 3	4	O	NR	NR	NR	0.0001	3.13	O	0.000097	2	O	0.022	559	O

Table 19-15. Dioxin and Dioxin-Like Discharges From Petroleum Refineries Reported to TRI in 2004–2009

Facility Name	Location	Comments	2009			2008			2007			2005			2004		
			Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
Suncor Energy Commerce City Refinery	Commerce City, CO	No DMR data; grams is driving force for 08–09 change in discharge	0.35	4	E1	0.35	8,176	E1	NR	NR	NR	0.111	9,104	M	0.037	3,333	M
Conoco Phillips, Ferndale Refinery	Ferndale, WA	No DMR data; grams is driving force for 08–09 change in discharge	0.2251	3	M2	0.2284	25,883	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
Martin Operating Ptnr LP	Smackover, AR	No DMR data; grams is driving force for 08–09 change in discharge	0.0005	0.1	O	0.00005	1	O	NR	NR	NR	NR	NR	NR	NR	NR	NR

Sources: TRIReleases2009_v2; TRIReleases2008_v3; TRIReleases2007_v2; TRIReleases2005_v2; and TRIReleases2004_v3.

NR: Not reported.

For indirect discharges, the mass shown is the mass transferred to the POTW that is ultimately discharged to surface waters, accounting for an estimated 83% removal of dioxin and dioxin-like compounds by the POTW.

Refineries reported basis of estimate in TRI as: M (monitoring data/measurements); M2 (periodic monitoring data/measurements); C (mass balance calculations); E (published emission factors); and O (other approaches, such as engineering calculations).

Table 19-16. PAC Discharges from Petroleum Refineries Reported to TRI in 2004–2009

Facility Name	Location	2009			2008			2007			2005			2004		
		Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate
Exxon Mobil Oil Corp Joliet Refinery	Channahon, IL	358	9,099	M2	337	8,566	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevron Products Co–Hawaii Refinery	Kapolei, HI	264.1	6,713	M2	250	6,354	M2	260	6,608	M2	270	6,862.6	M	270	6,863	M
Flint Hills Resources LP–West Plant	Corpus Christi, TX	103.1	2,620	M2	4.8	122	M2	5.4	137	M2	10.6	269.4	M	16	412	M
Chevron Products Co. Pascagoula Refinery	Pascagoula, MS	85.9	2,183	O	88.8	2,257	O	NR	NR	NR	126.1	3,205.1	O	115	2,923	O
Conoco Phillips Co–Bayway Refinery	Linden, NJ	75.3	1,914	O	13.8	351	O	5.6	142	O	NR	NR	NR	NR	NR	NR
BP Products North America Inc., Toledo Refinery	Oregon, OH	68	1,728	M2	78	1,983	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
Marathon Petroleum Co. LLC, Saint Paul Park Refinery	Saint Paul Park MN	49	1,245	C	51	1,296	C	NR	NR	NR	95.7	2,431.1	M	24	616	M
PDV Midwest Refining LLC, Lemont Refinery	Lemont, IL	37.91	964	M2	38.58	981	O	35.96	914	O	32.1	814.9	M	NR	NR	NR
ConocoPhillips Co–Alliance Refinery	Belle Chasse, LA	32.3329	822	M2	NR	NR	NR	43.3	1,103	O	43.8	1114.3	M	49	1,233	M
Marathon Petroleum Co, LLC	Texas City, TX	30.2	768	M2	31.4	798	M2	31.5	801	M2	34.6	879.4	M	29	742	M
Lake Charles Carbon Co.	Lake Charles, LA	28.2	717	O	12.7	323	O	NR	NR	NR	7.2	183	M	NR	NR	NR
Chevron Products Co, Div of Chevron USA Inc.	El Segundo, CA	27	686	M2	34.2	869	M2	81.5	2,011	M2	137.4	3,492.3	M	113	2,882	M
Flint Hills Resources LP–East Plant	Corpus Christi, TX	26.2	666	M2	0.6	15	M2	NR	NR	NR	0.5	12.7	M	0.6	15	M
Motiva Enterprises, LLC	Port Arthur, TX	25	635	O	22	559	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
Marathon Ashland Petroleum LLC, Illinois Refining Div	Robinson, IL	24	610	O	24.5	623	O	24.7	628	O	24	610	O	28	712	O
Lyondell-Citgo Refining LP	Houston, TX	20.71	526	M2	62.59	1,591	M2	13.57	345	M2	3	76.3	M	0	0	M
Valero Refining Co, Louisiana	Krotz Springs, LA	20.5	521	M2	20.7	526	M2	22.4	569	M2	23	584.6	O	22	567	O
ConocoPhillips Co, Wood River Refinery	Roxana, IL	13	330	O	10	254	O	9	229	O	11	279.6	O	11	280	O

Table 19-16. PAC Discharges from Petroleum Refineries Reported to TRI in 2004–2009

Facility Name	Location	2009			2008			2007			2005			2004		
		Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate
Wynnewood Refining Co.	Wynnewood, OK	13	330	M2	12	305	M2	NR	NR	NR	NR	NR	NR	10	254	O
Valero Refining New Orleans LLC	New Sarpy, LA	7.4138	188	O	7.767	197	O	7	178	O	9	228.8	O	9	229	O
ConocoPhillips Co., Lake Charles Refinery	Westlake, LA	5.88	149	O	39.4	1,001	O	NR	NR	NR	41	1,042.1	O	43	1,093	O
Exxon Mobil Corp, Everett Terminal	Everett, MA	5.2	132	O	5.5	140	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
Premcor Refining Group Inc.	Delaware City, DE	5	127	O	5	127	O	4	102	O	3.4	86.4	O	4	102	O
Tesoro Alaska–Kenai Refinery	Kenai, AK	5	127	O	5	127	O	5	127	O	19	482.9	O	18.9	480	O
Marathon Petroleum Corp Garyville	Garyville, LA	5	127	M2	5	127	M2	5	127	C	5	127.1	C	5	127	C
ConocoPhillips San Francisco Refinery	Rodeo, CA	4	102	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevron Products Co, Richmond Refinery	Richmond, CA	3.7	94	M2	18	458	M2	16	407	M2	19	482.9	M	19.3	491	M
ConocoPhillips Co, Santa Maria Refinery	Arroyo Grande, CA	3.7	94	E2	3	76	E2	3	76	E2	2	50.8	O	2	51	O
BP Products North America Whiting	Whiting, IN	3.5	89	O	1.4	36	O	2.5	63.5	O	3.6	91.5	O	1	25	O
Premcor Hartford Distribution Center	Hartford, IL	2.7	69	M1	1.2	31	M1	0.8	20.3	M1	NR	NR	NR	NR	NR	NR
Exxon Mobil Refining & Supply Baton Rouge Refinery	Baton Rouge, LA	2	51	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Suncor Energy Commerce City Refinery	Commerce City, CO	2	51	O	2	51	O	NR	NR	NR	19	482.9	O	28	712	O
Tesoro Refining & Marketing Co.	Anacortes, WA	1	25	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Koppers Inc. Monessen Coke Plant	Monessen, PA	1	25	O	4.7	119	O	2.9	74	O	3.2	322	O	NR	NR	NR
Shell Oil Products US Puget Sound Refinery	Anacortes, WA	1	25	E1	0.9	23	E1	1	25.4	E1	1	25.4	O	1	25	O
Global Cos LLC, South Portland Terminal	South Portland, ME	0.874	22	M2	0.08	2	M2	NR	NR	NR	1.3	33.04	M	NR	NR	NR

Table 19-16. PAC Discharges from Petroleum Refineries Reported to TRI in 2004–2009

Facility Name	Location	2009			2008			2007			2005			2004		
		Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate
Tesoro Refining and Marketing Co.	Martinez, CA	0.7	18	M2	0.8	20	M2	0.6	15.2	M2	0.6	15.3	M	0.5	12	M
Triram Connecticut, LLC	Portland, CT	0.59	15	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chevron Products Co, Salt Lake City Refinery	Salt Lake City, UT	0.56	14	M2	0.53	13	M2	61	1,550	M2	60	1,525	M	59	1,500	M
National Co-op Refinery Assoc.	McPherson, KS	0.4	10	M2	1	25	M2	2.4	61	M2	NR	NR	NR	NR	NR	NR
Martin Product Sales, LLC	Beaumont, TX	0.26	7	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Global South Terminal, LLC	Revere, MA	0.25	6	O	0.3	8	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sprague Searsport Terminal	Searsport, ME	0.22336	6	C	0.643	16	C	NR	NR	NR	35.5	902	C	NR	NR	NR
Flint Hills Resources LP, McFarland Terminal	McFarland, WI	0.21	5	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
ConocoPhillips Co. Trainer Refinery	Trainer, PA	0.2	5	O	NR	NR	NR	0.3	7.62	O	0.1	3.6	O	0.2	5	O
Valero Refining, Texas LP, Corpus Christi West Plant	Corpus Christi, TX	0.15	4	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sprague River Road Terminal	Newington, NH	0.10837	3	C	0.0944	2	C	NR	NR	NR	0.115	2.9	C	NR	NR	NR
Global Revco Terminal, LLC	Revere, MA	0.105	3	O	0.42	11	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sprague, South Portland	South Portland, ME	0.10361	3	C	0.13	3	C	NR	NR	NR	0.147	3.72	C	NR	NR	NR
Chevron Products Co.	Perth Amboy, NJ	0.1	3	O	0.2	5	O	NR	NR	NR	0.6	15.3	O	0.9	23	O
Conoco Phillips Co. Pipeline, Pasadena Terminal	Pasadena, TX	0.1	3	O	0.171	4	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
BP West Coast Products LLC Carson	Carson, CA	0.1	3	M2	NR	NR	NR	NR	NR	NR	0.1	2.5	M	NR	NR	NR
Sprague, Quincy	Quincy, MA	0.0885	2	E2	0.1457	4	E2	NR	NR	NR	1.575	40.02	O	NR	NR	NR
Exxon Mobil Oil Corp, Des Plaines Terminal	Arlington Heights, IL	0.05	1	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Exxon Mobil Oil Corp, East Providence Terminal	East Providence, RI	0.04	1	O	1.5	38	O	NR	NR	NR	1.6	40.67	O	NR	NR	NR
Sprague, Providence	Providence, RI	0.01155	0	C	0.2804	7	C	NR	NR	NR	5.81	148	C	NR	NR	NR
Conoco Phillips Co, Gulf Coast Lubes Plant	Sulphur, LA	0.01	0	O	0.0045	0	O	NR	NR	NR	0	0	O	NR	NR	NR

Table 19-16. PAC Discharges from Petroleum Refineries Reported to TRI in 2004–2009

Facility Name	Location	2009			2008			2007			2005			2004		
		Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate	Pounds Released	TWPE	Basis of Estimate
Premcor West Memphis Terminal	West Memphis, AR	0.0038	0	C	0.0039	0	C	0.0029	0.074	C	NR	NR	NR	NR	NR	NR
Metro Terminals Corp	Brooklyn, NY	0.003	0	O	0.003	0	O	NR	NR	NR	0.008	0.203	O	NR	NR	NR
Indirect																
Marathon Petroleum Co LLC Michigan Refining Div	Detroit, MI	100.7	188	M2	8.7584	223	M2	8.97	228	M2	94	175.8	M	98	184	M
Western Refining Co El Paso Refinery	El Paso, TX	48	90	O	4.4896	114	O	0.44	11.2	O	54	101	O	51	95	O
Safety-Kleen Systems, Inc. Buffalo Oil Recovery Factory	Buffalo, NY	3.68	7	M2	0.2944	7	M2	0.66	17	M2	1.2	2.24	M	NR	NR	NR
Sunoco, Inc (R&M) Philadelphia Refinery	Philadelphia, PA	3	6	M2	0.2208	6	M2	0.07	1.87	M2	NR	NR	NR	NR	NR	NR

Sources: TRIReleases2009_v2; TRIReleases2008_v3; TRIReleases2007_v2; TRIReleases2005_v2; and TRIReleases2004_v3.

NR: not reported.

Refineries reported basis of estimate in TRI as: M (monitoring data/measurements); M1 (constant monitory data/measurements); M2 (periodic monitoring data/measurements); C (mass balance calculations);

E (published emission factors); E1 (published emission factors); E2 (site-specific emission factors); and O (other approaches, such as engineering calculations).

20. PULP, PAPER, AND PAPERBOARD (40 CFR PART 430)

EPA identified the Pulp, Paper, and Paperboard (Pulp and Paper) Category (40 CFR Part 430) for preliminary review because it continues to rank high, in terms of toxic-weighted pound equivalent (TWPE), in point source category rankings. EPA previously reviewed discharges from pulp and paper facilities as part of the Preliminary and Final Effluent Guidelines Program Plans in 2004–2010 (U.S. EPA, 2004, 2006a, 2007, 2008, 2009a, 2011). During its 2006 Final Effluent Guidelines Program Plan reviews, EPA also conducted a detailed study of this industry (U.S. EPA, 2006b). This section summarizes the results of the 2011 Annual Reviews associated with the Pulp and Paper Category. The review focused on discharges of dioxin and dioxin-like compounds and manganese and manganese-like compounds from the Toxics Release Inventory (TRI), and sulfide and aluminum discharges from discharge monitoring reports (DMR), because of their high TWPE relative to other pollutants in the Pulp and Paper Category.

20.1 Pulp and Paper Toxicity Rankings Analysis

Table 20-1 compares the toxicity rankings analysis results for the Pulp and Paper Category from the 2007 through 2011 Annual Reviews. The combined TWPE from discharges in the DMR and TRI databases increased from 2008 to 2009. The estimated 2009 TRI TWPE accounts for approximately 77 percent of the combined 2009 category TWPE.

Table 20-1. Pulp and Paper Category TRI and DMR Discharges for 2007 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Pulp and Paper Manufacturing Category		
		TRI TWPE[a]	DMR TWPE[b]	Total
2004	2007	669,000	165,000	833,000
2007	2009	460,000[c]	2,730,000	3,190,000[d]
2008	2010	523,000	348,000	871,000
2009	2011	956,000	287,000	1,240,000

Sources: TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2004 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

[c] Includes discharges from facilities reporting NAICS code 326112. These discharges should be associated with the Plastics Molding and Forming Category (40 CFR Part 463). EPA has corrected future versions of the database to reflect this change.

[d] During the 2009 Annual Reviews, EPA contacted facilities to verify the concentrations of dioxin and dioxin-like compounds in PCS and ICIS-NPDES and found that for all facilities contacted, there were either unit errors (e.g., measurements reported in ng/L but in the database as mg/L) or missing non-detect indicators. After corrections, the new 2009 category total TWPE was 712,000.

20.2 Pulp and Paper Category Pollutants of Concern

EPA's review of the Pulp and Paper Category focused on the 2009 TRI and DMR discharges because both contribute to the category's combined TWPE. Table 20-2 lists the five pollutants with the highest TWPE in *TRIReleases2008_v3* and *TRIReleases2009_v2*. Table 20-3 lists the five pollutants with the highest TWPE in *DMRLoads2007_v3* and *DMRLoads2009_v2*.

The top TRI pollutants, dioxin and dioxin-like compounds and manganese and manganese compounds, contribute more than 83 percent of the total TRI TWPE. The top DMR pollutants, sulfide and aluminum, contribute more than 73 percent of the total DMR TWPE.

Table 20-2. Pulp and Paper Category Top TRI Pollutants

Pollutant	2008[a]			2009[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Dioxin and dioxin-like compounds	3	49	36,500	1	51	494,000
Manganese and manganese compounds	1	117	308,000	2	115	298,000
Lead and lead compounds	2	185	63,800	3	181	61,100
Mercury and mercury compounds	Pollutant not reported in the top five 2008 TRI-reported pollutants.			4	87	16,300
Polycyclic aromatic compounds	5	34	19,300	5	27	15,900
Zinc and zinc compounds	4	90	21,200	Pollutant not reported in the top five 2009 TRI-reported pollutants.		
Pulp and Paper Category Total	**NA**	**250[b]**	**523,000**	**NA**	**250[b]**	**956,000**

Sources: TRIReleases2008_v3 and TRIReleases2009_v2.
[a] Discharges include transfers to POTWs and account for POTW removals.
[b] Number of facilities reporting TWPE greater than zero.
NA – Not applicable.

Table 20-3. Pulp and Paper Category Top DMR Pollutants

Pollutant	2008			2009		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Sulfide	2	2	116,000	1	3	147,000
Aluminum	3	26	68,800	2	32	63,100
2,3,7,8-tetrachlorodibenzo-p-dioxin	1	5	118,000	3	3	26,100
Chlorine	4	33	16,800	4	34	17,900
Mercury	Pollutant not reported in the top five 2008 DMR-reported pollutants.			5	16	10,100
Iron	5	14	5,970	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Pulp and Paper Category Total	**NA**	**158[a]**	**348,000**	**NA**	**157[a]**	**287,000**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.
[a] Number of facilities reporting TWPE greater than zero.
NA: Not applicable.

EPA's additional review for the Pulp and Paper Category focused on the 2009 TRI and DMR database pollutants of concern, dioxin and dioxin-like compounds, manganese and manganese compounds, sulfide, and aluminum, presented in the following subsections. EPA did not investigate the other top pollutants as part of the 2011 Annual Reviews.

20.3 Pulp and Paper Category Dioxin and Dioxin-like Compound Discharges in TRI

Dioxin and dioxin-like compounds contribute 52 percent of the total 2009 TRI TWPE and increased by nearly 14 times from reporting years 2008 and 2009. Table 20-4 summarizes the number of facilities and total TWPE for discharge years 2004 through 2009. Table 20-16, presented at the end of this section, lists the pulp and paper mills that reported dioxin and dioxin-like compound discharges to TRI in 2009. Table 20-4 demonstrates the large increase in estimated TWPE. Table 20-16 shows that the majority of this increase results from a single facility.

Table 20-5 summarizes the 2009 basis of estimates reported by the 51 paper mills discharging dioxin in 2009 by type of estimate. Of the 51 pulp and paper mills reporting dioxin and dioxin-like compound discharges in 2009, only 15 reported discharges based on analytical measurements, the majority never measured for dioxin and dioxin-like compounds.

To determine why dioxin and dioxin-like compound discharge estimates had significantly increased from 2008 to 2009, EPA followed the revised methodology from the 2006 Pulp, Paper, and Paperboard Detailed Study (U.S. EPA, 2006b). The revised methodology was used to estimate the TWPE of reported releases of dioxin and dioxin-like compounds. EPA used the actual distribution of wastewater effluent measurement data provided by individual mills. If such data were not available, EPA used the dioxin congener distribution of the mill discharges used to develop the National Council for Air and Stream Improvement (NCASI) *SARA Handbook* emission factor.

Table 20-4. Summary of Dioxin and Dioxin-Like Compound Discharges, 2004–2009

	Year of Discharge				
	2009	2008	2007	2005	2004
Number of facilities	51	49	42	56	64
Total TWPE	494,000	36,500	86,400	147,000	178,000

Sources: TRIReleases2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; TRIReleases2008_v3; and TRIReleases2009_v2.

Table 20-5. Basis of Estimate Summary for 2009 Dioxin and Dioxin-Like Compound Discharges

	Basis of Estimate			
	M1 or M2	C	E1 or E2	O
Number of facilities[a]	15	7	23	8

Source: TRIReleases2009_v2.

[a] There are a total of 51 pulp and paper mills that report dioxin discharges to the 2009 TRI database. The counts above include basis of estimates for plants that have both indirect and direct discharges, which may account for double counting of facilities.

M1: Continuous monitoring data or measurements

M2: Periodic or random monitoring data or measurements

C: Mass balance calculations, such as calculation of the amount of the toxic chemical in streams entering and leaving process equipment

E1: Published emission factors

E2: Site-specific emission factors

O: Other approaches, such as engineering calculations

The following sections discuss the top dioxin and dioxin-like compound discharger, Simpson Tacoma Kraft Co., LLC (Simpson Tacoma), in Tacoma, WA, and the remaining dioxin and dioxin-like compound dischargers. Simpson Tacoma accounts for 46 percent of the category's 2009 TRI dioxin and dioxin-like compound discharges and therefore is presented separately.

20.3.1 Simpson Tacoma Kraft Co., LLC

Table 20-6 presents dioxin and dioxin-like compound discharges for Simpson Tacoma from 2005 through 2009. As shown in Table 20-6, the TWPE increased by more than 228,000 from 2008 to 2009. As part of the 2011 Annual Reviews, EPA contacted the American Forest and Paper Association (AF&PA) about the 2009 TRI dioxin discharges. AF&PA is the national trade association of the forest, pulp, paper, paperboard, and wood products industry. AF&PA stated that the congener distributions for reporting years 2005 through 2007 were based only on sampling of two dioxin congeners (2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran). In recent years, the facility has performed full congener testing, which resulted in detections of other congeners (Schwartz, 2011). The full congener testing was fully incorporated into the TRI database in 2009, which is demonstrated by the increase in TWPE. Table 20-7 presents the facility-specific dioxin and dioxin-like congener distribution for 2008 and 2009.

Table 20-6. Dioxin and Dioxin-Like Compound Discharges in TRI for Simpson Tacoma, 2005–2009

Dioxin Compounds	2009	2008	2007	2006	2005
Pounds released	0.005	0.004	0.0002	0.0002	0.0003
TWPE	229,000	243	207	218	276

Sources: TRIReleases 2005 v02; TRIReleases 2006 v01; TRIReleases 2007 v2; TRIReleases2008_v3; and TRIReleases2009_v2, AF&PA Contact (Schwartz, 2011).

Table 20-7. Facility-Specific Dioxin and Dioxin-Like Congener Distribution

Congener Number	Chemical Name	TWF	2008 Distribution (%)	2009 Distribution (%)
1	Tetrachlorodibenzo-p-dioxin, 2,3,7,8-	703,584,000	0	0
2	Pentachlorodibenzo-p-dioxin, 1,2,3,7,8-	692,928,000	0	0
3	Hexachlorodibenzo-p-dioxin, 1,2,3,4,7,8-	23,498,240	0	3.20
4	Hexachlorodibenzo-p-dioxin, 1,2,3,6,7,8-	9,556,480	0	5.31
5	Hexachlorodibenzo-p-dioxin, 1,2,3,7,8,9-	10,595,840	0	4.22
6	Heptachlorodibenzo-p-dioxin, 1,2,3,4,6,7,8-	411,136	14.7	20.22
7	Octachlorodibenzo-p-dioxin	6,586	85.3	40.23
8	Tetrachlorodibenzofuran, 2,3,7,8-	43,819,554	0	1.25
9	Pentachlorodibenzofuran, 1,2,3,7,8-	7,632,640	0	3.69
10	Pentachlorodibenzofuran, 2,3,4,7,8-	557,312,000	0	7.34
11	Hexachlorodibenzofuran, 1,2,3,4,7,8-	5,760,000	0	2.57
12	Hexachlorodibenzofuran, 1,2,3,6,7,8-	14,109,440	0	3.11
13	Hexachlorodibenzofuran, 1,2,3,7,8,9-	47,308,800	0	0
14	Hexachlorodibenzofuran, 2,3,4,6,7,8-	51,204,160	0	4.14
15	Heptachlorodibenzofuran, 1,2,3,4,6,7,8-	85,760	0	0
16	Heptachlorodibenzofuran, 1,2,3,4,7,8,9-	3,033,984	0	0
17	Octachlorodibenzofuran	2,021	0	4.73
Total TWF			**66,100**	**46,200,000**

Source: AF&PA contact (Schwartz, 2011).

20.3.2 Remaining Dioxin and Dioxin-Like Discharging Facilities

The next 19 facilities account for 52 percent of the dioxin and dioxin-like compound TRI TWPE. As part of the 2011 Annual Reviews, EPA contacted AF&PA and NCASI about the dioxin and dioxin-like discharges from 19 pulp and paper mills. NCASI is a nonprofit research institute funded by North American forest products industry, including pulp and paper facilities. Many of the companies that fund NCASI are also members of AF&PA. This information request resulted in the findings presented in Table 20-8. Four facilities provided revisions to their dioxin and dioxin-like compound discharges, which EPA will incorporate into future versions of the *TRIReleases2009_v2* database:

- Boise White Paper in Wallula, WA, documented revisions to its original TRI data. The revisions has ceased to report a "quantity treated on-site" due to a previously incorrect assumption, is using actual dioxin test results instead of published emission factors for effluent and primary sludge, and has corrected a formula for calculating the emissions from the recovery boilers that caused the value to be off by a factor of 10. The facility also documented using half the detection limit for BDL results. Since the BDL results were non-detect, a "<" should have been incorporated into the database instead of using half the limit (Wiegand, 2011). EPA incorporated these changes and estimates 2.30 grams and 156,000 TWPE of dioxin and dioxin-like compounds discharged in 2009 for Boise White Paper.

- The Georgia-Pacific Naheola Mill in Pennington, AL, documented an error in its original TRI data: the grams released to water and the grams released to land were transposed (Wiegand, 2011). After correcting this error, EPA estimates 3.6 grams and 10,800 TWPE of dioxin and dioxin-like compounds discharged in 2009 for Georgia-Pacific.

- Clearwater Paper Corp. in Arkansas City, AR, documented an error in the reported octachlorodibenzo-p-dioxin discharges—an incorrect conversion from picograms to grams (Wiegand, 2011). After the correction, EPA estimates 1.83 grams and 3,240 TWPE of dioxin and dioxin-like compounds discharged in 2009 for Clearwater Paper Corp.

- Abitibowater Calhoun Operations in Calhoun, TN, documented that all dioxin congeners were non-detect and missing the “<” in the database (Wiegand, 2011). After the correction, EPA estimates zero pounds and zero TWPE of dioxin and dioxin-like compounds discharged in 2009 for Abitibowater Calhoun Operations.

Table 20-8. Information on Top Pulp and Paper Category 2009 TRI Dioxin and Dioxin-Like Compound Dischargers

Name	Location	Grams of Dioxin Discharged	TWPE	Data Verification	Discharge Calculation Methodology	Bleaching Process Description
Boise White Paper, LLC	Wallula, WA	Revised: 2.30 Original: 0.21	Revised: 156,000 Original: 13,800	Provided data showing reporting errors; therefore EPA revised database	Based on effluent sampling, using half the detection limit for BDL results	No change since the Pulp and Paper Detailed Study
Kimberly-Clark	Everett, WA	0.419	55,300	Confirmed data	Based on mass balances using historical congener data, using half the detection limit for BDL results	No change since the Pulp and Paper Detailed Study
S.D. Warren Co.	Skowhegan, ME	0.184	37,900	Confirmed data	Based on May 2002 final effluent sampling data using 0 for BDL results, corrected for the annual flow	No change since the Pulp and Paper Detailed Study
Rayonier Performance Fibers	Fernandina Beach, FL	5.20	37,800	Confirmed data	Based on quarterly measurements, using 0 for BDL results	No change since the Pulp and Paper Detailed Study; uses hypochlorite periodically as a viscosity modifier in the bleaching process
Clearwater Paper Corp.	Lewiston, ID	0.4	15,500	Confirmed data	Based on effluent sampling, using half the detection limit for BDL results	No change since the Pulp and Paper Detailed Study
Georgia-Pacific, Naheola Mill	Pennington, AL	Revised: 3.6 Original: 2	Revised: 10,800 Original: 8,490	Provided data showing reporting errors; therefore EPA revised database	Based on NCASI release factors	No change since the Pulp and Paper Detailed Study; portion of post-converting tissue broke receives hypochlorite treatment
International Paper	Franklin, VA	2.14	10,400	Confirmed data	Based on NCASI release factors, using 0 for BDL results	Switched from ozone to chlorine dioxide for bleaching in 2006
Georgia-Pacific	Crossett, AR	5.09	8,990	Confirmed data	Based on NCASI release factors	No change since the Pulp and Paper Detailed Study

Table 20-8. Information on Top Pulp and Paper Category 2009 TRI Dioxin and Dioxin-Like Compound Dischargers

Name	Location	Grams of Dioxin Discharged	TWPE	Data Verification	Discharge Calculation Methodology	Bleaching Process Description
Nippon Paper Industries	Port Angeles, WA	0.035	8,370	Confirmed data	Based on 2006 final effluent sampling , using half the detection limit for BDL results	No change since the Pulp and Paper Detailed Study
Evergreen Packaging	Pine Bluff, AR	3.21	5,690	Confirmed data	Based on NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Procter & Gamble Paper Products	Mehoopany, PA	0.02	4,520	Confirmed data	Based on dioxin congener tool calculations, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Boise White Paper	Jackson, MS	2.28	4,030	Confirmed data	Based on effluent sampling for TCDD and NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Rock-Tenn Mill Co.	Demopolis, AL	2.17	3,840	Confirmed data	Based on effluent sampling for TCDD and NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
International Paper	Riegelwood, NC	0.07	3,510	Confirmed data	Based on 2000 final effluent sampling , using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Clearwater Paper Corp.	Arkansas City, AR	Revised: 1.83 Original: 0.456	Revised: 3,240 Original: 3,220	Provided data showing reporting errors; therefore EPA revised database	Based on effluent sampling for TCDD and TCDF and NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Weyerhauser	Vanceboro, NC	1.36	2,720	Confirmed data	Based on effluent sampling for OCDD and NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Georgia-Pacific Corp.	Palatka, FL	1.40	2,480	Confirmed data	Based on NCASI release factors, using 0 for BDL results	Replaced the brown stock washers and installed an oxygen delignification system

Table 20-8. Information on Top Pulp and Paper Category 2009 TRI Dioxin and Dioxin-Like Compound Dischargers

Name	Location	Grams of Dioxin Discharged	TWPE	Data Verification	Discharge Calculation Methodology	Bleaching Process Description
Domtar Paper Co.	Plymouth, NC	3.48	2,370	Confirmed data	Based on effluent sampling for TCDD and TCDF and NCASI release factors, using 0 for BDL results	No change since the Pulp and Paper Detailed Study
Abitibowater Calhoun Operations	Calhoun, TN	Revised: 0 Original: 0.685	Revised: 0 Original: 24,900	Provided data showing all congeners were BDL; therefore EPA revised database	Based on October 2000 sampling and annual flow, using 0 for BDL results	No change since the Pulp and Paper Detailed Study

Sources: NCASI contact (Wiegand, 2011); *TRIReleases2009_v2*.

As part of the 2006 Pulp and Paper Detailed Study, EPA determined that the vast majority of data underlying the estimated releases of dioxin and dioxin-like compounds reported to TRI (both NCASI data and facility-specific data) are based on pollutant concentrations below the Method 1613B minimum levels. Therefore, the TRI-reported discharges of dioxin and dioxin-like compounds for this category do not accurately reflect current industry discharges (U.S. EPA, 2006b).

As part of the 2011 Annual Reviews, EPA collected data on bleach plant changes because the bleaching process generates dioxin and dioxin-like compounds. Paper companies can significantly reduce their dioxin generation by switching from elemental chlorination (using chlorine gas) to using elemental-chlorine free bleaching by using chlorine dioxide. Table 20-8 lists bleach plant changes provided by NCASI. Of the facilities contacted, none changed their bleaching processes in ways expected to significantly reduce dioxin generation, such as switching to elemental chlorine free bleaching (e.g., chlorine dioxide). One plant changed from ozone to chlorine dioxide; however, NCASI data show no significant change in dioxin generation would result (NCASI, 2005). Based on these data, EPA concludes that there have not been recent significant bleaching process changes in the pulp and paper industry.

As shown in Table 20-8, the pulp and paper industry continues to use NCASI release factors or facility-specific sampling data to calculate dioxin and dioxin-like compound discharges in the pulp and paper industry. EPA gathered some facility-specific data and was in contact with AF&PA and NCASI to confirm the facility-specific data for all of the facilities listed in Table 20-8. Upon completion of the 2011 Annual Reviews, EPA collected all data necessary to determine if the conclusions reached in the 2006 Pulp and Paper Detailed Study are still applicable from AF&PA, NCASI, and specific pulp mills (U.S. EPA, 2006b). EPA will review the data and conclude its review of dioxin discharges in its 2012 Annual Reviews.

20.4 Pulp and Paper Category Manganese and Manganese Compound Discharges in TRI

Manganese and manganese compound discharges in the 2009 TRI database account for 31 percent of the total TRI TWPE. Each facility accounts for less than 5 percent of the TWPE; no outliers exist in the TRI database.

As part of the Pulp and Paper Detailed Study, EPA determined the manganese and manganese compounds are present in the intake water and may be contaminants in process chemicals. Table 20-9 shows the manganese and manganese compound discharges in the TRI and DMR databases from 2002 to 2009. EPA examined reported manganese and manganese compound discharges from pulp and paper facilities during the Pulp and Paper Detailed Study for the 2006 Plan and its previous preliminary studies. EPA obtained discharge data in Form 2C of NPDES permit applications for 40 mills. EPA concluded that typical metal discharges from pulp and paper mills were at concentrations too low to treat using end-of-pipe treatment technologies for large plant flow rates (U.S. EPA, 2006b). Although EPA has not reviewed new discharge concentration data, it has no new data to suggest that manganese concentrations are above the treatable levels. As shown in Table 20-9, the TWPE is consistent from discharge year 2002 to 2009 and, therefore, EPA's previous conclusions from the detailed study are still accurate: manganese and manganese compound discharges in the pulp and paper category are below treatable levels.

Table 20-9. 2002–2009 Manganese and Manganese Compound Discharges in TRI and DMR

Discharge Year	Review Year	TRI Data		DMR Data	
		Number of Dischargers	Total TWPE	Number of Dischargers	Total TWPE
2002	2006	112	304,000	4	287
2004	2007	117	316,000	5	5,190
2007	2009	79	231,000	5	3,210
2008	2010	117	308,000	3	3,040
2009	2011	115	298,000	3	2,960

Sources: TRIReleases2002; PCSLoads2002; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

20.5 Pulp and Paper Category Sulfide Discharges in DMR

Table 20-10 presents the top sulfide dischargers in the 2009 DMR database. The majority (92 percent) of the sulfide discharges were from one facility, Smurfit-Stone Container in Florence, SC. EPA focused the sulfide discharges review on this facility.

Table 20-10. Pulp and Paper Category Top Sulfide Discharging Facilities in the 2009 DMR Database

Facility Name	Facility Location	Pounds of Sulfide Discharged	Sulfide TWPE	Percentage of Pulp and Paper Category 2009 DMR Sulfide TWPE
Smurfit-Stone Container	Florence, SC	48,400	135,000	92%
Remaining facilities reporting sulfide discharges[a]		4,040	11,300	8%
Total		**52,400**	**147,000**	**100%**

Source: *DMRLoads2009_v2*.

[a] There are two remaining facilities that have sulfide discharges in the 2009 DMR database, which account for 8 percent of the category's sulfide DMR TWPE.

20.5.1 Sulfide Formation and Treatment Options

Sulfides are constituents of many industrial wastes such as those from tanneries, paper mills, chemical plants, and gas works (U.S. EPA, 1986). Sulfides discharged to neutral receiving waters can be reduced to hydrogen disulfide (H_2S), an extremely toxic, odiferous, and corrosive gas. Minute concentrations (2 micrograms per liter) of H_2S impart an objectionable odor and taste to water, making it unfit for municipal consumption (U.S. EPA, 1974).

Sulfide is an anion of sulfur in its lowest oxidation state of minus 2 (S^{2-}). The dianion S^{2-} exists only in strongly alkaline aqueous solutions. Such solutions can form by dissolution of H_2S or alkali metals such as lithium sulfide, sodium sulfide, and potassium sulfide in the presence of excess hydroxide ions. The ion S^{2-} is exceptionally basic, with an acid dissociation constant (pK_a) greater than 14. Sulfide does not exist in appreciable concentrations even in highly alkaline water. Instead, sulfide combines with protons to form HS^-, which is variously called H_2S ion. At still lower pH values (<7), HS^- converts to H_2S, as shown by the equation below. At a pH of 5, nearly 100 percent of sulfide is present as H_2S.

$$H_2S \Leftrightarrow HS^- + H^+ \text{ and } HS^- \Leftrightarrow S^- + H^+ \qquad \text{(Eq. 20-1)}$$

Sulfides are moderately strong reducing agents. They react with oxygen in the air in elevated temperatures to form higher-valence sulfur salts, such as sulfates and sulfur dioxide. Aqueous solutions of transition metals cations react with sulfides to precipitate solid metal sulfide salts. The metal sulfide salts typically have very low solubility in water.

Table 20-11 presents available sulfide treatment options in the pulp and paper industry (see Section 18.5 for more details). Although these treatment options can remove sulfide from wastewater, the actual effluent concentrations attainable are a function of treatment system design (Briggs, 2011).

Table 20-11. Sulfide Wastewater Treatment Options

Technology Name	Treatability Concentrations	Description
Biological treatment	Up to 99 percent sulfide removal	Treats industrial effluent streams by either aerobic or anaerobic processes. The treatment involves bacteria decomposing waste to form harmless inorganic solids. Studies show that approximately 99 percent of the influent sulfide concentration can be biologically oxidized to sulfate.
Aeration and air stripping	Up to 100 percent sulfide removal	Aeration involves removal of dissolved gasses such as H_2S from water, and is generally used in two types of water applications: air stripping and aeration. The effectiveness of aeration for removing sulfide depends on the aeration method selected, the pH of the water, design factors, flow and loading rate, available area of mass transfer, temperature, and algae production. The major drawback to aeration is that H_2S is not destroyed but converted to an air emission.
Hydrogen peroxide oxidation	Up to 100 percent sulfide removal	This process controls sulfide by oxidation to either elemental sulfur or sulfate ion by hydrogen peroxide (H_2O_2) addition, depending on the pH of the wastewater. It can approach 100% efficiency if H_2O_2 is added in a controlled fashion and the reaction medium is thoroughly mixed. No additional wastewater processing is required following peroxide oxidation because sulfate is very soluble in water.

Sources: ERG sulfide treatment technologies memo (Briggs, 2011); "Biological Treatment of Tannery Wastewater" article (Durai and Rajasimman, 2010).

20.5.2 Smurfit-Stone Container

Sulfide discharges from Smurfit-Stone, in Florence, SC, account for approximately 47 percent of the DMR TWPE for the Pulp and Paper Category. All of Smurfit-Stone's sulfide discharges are from outfall 001. Table 20-12 presents the sulfide discharge concentrations in the DMR Loadings Tool. The facility's permit includes monitoring and reporting requirements for sulfide, but there are no sulfide numeric limits in the permit (O'Shaughnessy, 2011). The Pulp and Paper Category effluent limitations guideline does not regulate sulfide.

As part of the 2011 Annual Reviews, EPA contacted AF&PA about Smurfit-Stone's sulfide discharges. The contact stated that the facility's kraft pulping process uses sodium-based alkaline pulping solution (liquor). This solution consists of sodium sulfide and sodium hydroxide in 10 percent solution. This is the primary source of sulfides in the wastewater. The wastewater is treated in the mill's wastewater treatment ponds before being discharged, but the facility does not have any specific treatment technologies in place for sulfide treatment (O'Shaughnessy, 2011).

Although the 2009 sulfide concentrations are not regulated by the facility's permit, the concentrations are below or near treatable levels (Briggs, 2011). EPA concludes that sulfide discharges do not represent a hazard priority at this time.

Table 20-12. Smurfit-Stone Container's Outfall 001 2009 Monthly Sulfide Discharge Data

Monitoring Period Date	DMR Loadings Tool Sulfide Concentrations (mg/L)	Average Flow (MGD)
31-Jan-09	<1	14.9
28-Feb-09	4	16.8
31-Mar-09	<1	8.3
30-Apr-09	1.1	14.1
31-May-09	0.79	20.8
30-Jun-09	1.2	13.2
31-Jul-09	1.9	17.5
31-Aug-09	1.34	11.1
30-Sep-09	<0.38	12.6
31-Oct-09	0.72	14
30-Nov-09	0.51	11.6
31-Dec-09	<0.38	8.6

Source: DMR Loadings Tool.

20.6 Pulp and Paper Category Aluminum Discharges in DMR

Aluminum discharges from pulp and paper mills in the 2009 DMR database account for 22 percent of the total DMR TWPE. Table 20-13 presents the category's aluminum dischargers in the 2009 database. The following sections discuss the top aluminum discharger, International Paper–Texarkana, in Texarkana, TX, (International Paper), and the remaining aluminum discharges in *DMRLoads2009_v2*. International Paper accounts for 57 percent of the category's 2009 DMR aluminum discharges and therefore is discussed separately.

Table 20-13. Pulp and Paper Category Aluminum Dischargers in the 2009 DMR Database

Facility Name	Location	Aluminum Pounds Discharged	Aluminum TWPE	Facility Percent of Aluminum Category TWPE
International Paper–Texarkana	Texarkana, TX	600,000	36,000	57%
Remaining facilities reporting aluminum discharges[a]		452,000	27,130	43%
Total		**1,050,000**	**63,100**	**100%**

Source: DMRLoads2009_v2.

[a] There are 31 remaining facilities that have aluminum discharges in the 2009 TRI database, which account for 43 percent of the category's aluminum DMR TWPE.

20.6.1 International Paper

EPA investigated the load estimation for International Paper to eliminate any errors. All of International Paper's aluminum discharges are reported at outfall 001. Table 20-14 presents the 2009 outfall 001 aluminum concentrations and average flows from the DMR Loadings Tool. The DMR Loadings Tool estimates discharges using available concentration and flow data for each month. For months of missing data, the DMR Loading Tool estimates the load based on other months' data. Facilities can differentiate months of zero discharge with a "no discharge," or NODI, code. When facilities do not report discharges, the Loading Tool first determines if no discharge, or NODI, was reported. When a NODI code is omitted, the DMR Loading Tool estimates the discharge for the missing month(s). See Section 3 of the EPA's 2009 SLA report for more information on NODI codes (U.S. EPA, 2009b). Table 20-14 shows that the facility did not report data or NODI codes for April through December 2009, causing the DMR Loadings tool to overestimate the discharge. After the correction, the facility's aluminum TWPE decreases from 36,000 to 9,000.

Table 20-14. International Paper's Outfall 001 2009 Monthly Aluminum Discharge Data

Monitoring Period Date	DMR Loadings Tool Aluminum Concentrations (mg/L)	Average Flow (MGD)
31-Jan-09	NODI C	NODI C
28-Feb-09	NODI C	NODI C
31-Mar-09	3.57	162.5
30-Apr-09	NR	NODI C
31-May-09	NR	NODI C
30-Jun-09	NR	NODI C
31-Jul-09	NR	NODI C
31-Aug-09	NR	NODI C
30-Sep-09	NR	NODI C
31-Oct-09	NR	NODI C
30-Nov-09	NR	NODI C
31-Dec-09	NR	NODI C

Source: DMR Loadings Tool.

NR: Not reported.

NODI C: The facility did not report a concentration or flow because no discharge occurred for the monitoring period.

20.6.2 Remaining Aluminum Dischargers

The remaining 31 pulp and paper facilities account for 43 percent of the 2009 aluminum DMR TWPE for the Pulp and Paper Category. Table 20-15 presents the median aluminum concentration from the 2002 and 2009 DMR data for pulp and paper mills. The 2006 Pulp and Paper Category Detailed Study used the 2002 data (U.S. EPA, 2006b).

As part of the Pulp and Paper Detailed Study, EPA determined that aluminum compounds are present in the intake water and may be contaminants in process chemicals. EPA also determined that aluminum concentrations are below treatable levels for end-of-pipe treatment technologies suitable for large effluent flows (U.S. EPA, 2006b). As shown in Table 20-15, the aluminum median effluent concentration has decreased since 2002. Therefore, EPA's previous conclusions from the detailed study are still accurate: aluminum discharges in pulp and paper effluent are below treatable levels.

Table 20-15. Median Concentration of Aluminum in Pulp and Paper Mill Effluent (µg/L)

Method Minimum Level (µg/L)	PCS 2002 Median (Mill Count) (µg/L)	DMR 2009 Median (Mill Count) (µg/L)
50	1,147 (8)	290 (31)

Sources: PCSLoads2002 and DMRLoads2009_v2.

20.7 Pulp and Paper Category Conclusions

The estimated toxicity of the Pulp and Paper Category discharges results mainly from TRI-reported discharges of dioxin and dioxin-like compounds and manganese and manganese compounds and DMR-reported discharges of sulfide and aluminum. Using data collected for the 2011 Annual Reviews, EPA concludes the following:

- Dioxin and dioxin-like compounds contribute 52 percent of the total 2009 TRI TWPE and increased by more than 14 times from reporting years 2008 to 2009. One facility, Simpson Tacoma, accounts for 46 percent of the dioxin and dioxin-like discharges. A change in congener testing caused the increase in TWPE for this facility. The majority of the remaining facilities with dioxin and dioxin-like compounds discharges base their calculations on NCASI release factors or facility-specific sampling data. In EPA's 2006 Pulp and Paper Detailed Study, data showed that the estimated releases of dioxin and dioxin-like compounds reported to TRI are based on pollutant concentrations below the Method 1613B minimum levels. Concentrations below the minimum level may not be accurate, and the measurements may not accurately reflect industry discharges. EPA collected data from AF&PA, NCASI, and specific pulp mills (U.S. EPA, 2006b). EPA will review the data and conclude its review of dioxin discharges in its 2012 Annual Reviews.

- Each facility discharging manganese and manganese compounds accounts for less than 5 percent of the manganese and manganese compound discharges to TRI; no outliers exist in the TRI database. EPA's 2006 Pulp and Paper Detailed Study concluded that metals concentrations in pulp and paper mill discharges were below treatable levels. The 2009 TRI data are consistent with the 2006 data; therefore EPA concludes that concentrations in pulp and paper wastewater are below treatable levels.

- Sulfide discharges contribute 52 percent of the total DMR TWPE. One facility, Smurfit-Stone in Florence, SC, accounts for 92 percent of the sulfide DMR TWPE. The sulfide concentrations for Smurfit-Stone are below or near treatable levels and therefore do not represent a hazard priority at this time.

- Aluminum discharges contribute 22 percent of the total DMR TWPE. One facility, International Paper in Texarkana, TX, accounts for 57 percent of the aluminum DMR TWPE. After correcting an error, the TWPE for this facility decreases from 36,000 to 9,000. The total 2009 TWPE for the Pulp and Paper Category decreases from 1,240,000 to 1,213,000. The remaining facilities account for 43 percent of the aluminum DMR TWPE. EPA found that aluminum is not a pollutant of concern because it is detected at concentrations below treatable levels with end-of-pipe treatment technologies suitable for large effluent flows.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category with a lower priority for revision (i.e., this category is marked with "(5)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

20.8 Pulp and Paper Category References

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Table 20-16. Dioxin and Dioxin-Like Discharges From Pulp and Paper Category Reported to TRI in 2004–2009

TRI ID	Facility Name	Location	2009			2008			2007			2005			2004		
			Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
98421-SMPSN-801PO	Simpson Tacoma Kraft Co.	Tacoma, WA	2.243	228,696	M2	NR	NR	NR	0.12	208	E1	0.154	277	E	0.135	242	E
98201-SCTTP-2600F	Kimberly-Clark Worldwide	Everett, WV	0.419	55,269	C	0.487	874	C	NR	NR	NR	1.33	2,380	C	2.7	4,846	C
04976-SDWRR-RFD3U	S.D. Warren Co.	Skowhegan, ME	0.184	37,877	E2	0.187	335	E2	0.15	269	E2	0.168	302	O	0.17	305	O
32034-TTRYN-FOOTO	Rayonier Performance Fibers, LLC	Fernandina Beach, FL	5.197	37,842	M1	0.66	1,184	M1	NR	NR	NR	0.56	1,000	M	1	1,794	M
37309-BWTRS-ROUTE	Abitibowater Calhoun Operations	Calhoun, TN	0.6854	24,888	E1	0.6875	1,234	E1	0.73	1,319	E1	0.87	1,560	M	0.94	1,690	M
83501-PTLTC-805MI	Clearwater Paper Corp, Idaho Pulp & Paperboard	Lewiston, ID	0.4	15,465	M2	0.4	718	M2	0.44	789	M2	0.441	792	E	4.18	7,501	E
99363-BSCSC-POBOX	Boise White Paper LLC	Wallula, WA	0.20886	13,745	O	0.205513	369	O	5.58	10,014	O	0.083	149	O	0.83	1,496	O
23851-NNCMP-HIGHW	International Paper-Franklin Mill	Franklin, VA	2.1364	10,440	E1	1.3677	2,454	E1	NR	NR	NR	NR	NR	NR	2.28	4,086	E
71635-GRGPC-PAPER	Georgia-Pacific Crossett Ops.	Crossett, AR	5.0851	8,993	E1	5.327	77	E1	5.6	10,043	E1	4.87	8,740	E	5.49	9,850	E
36916-JMSRV-ROUTE	Georgia-Pacific Consumer Products LP	Pennington, AL	2	8,488	E1	3.44	50	E1	3.2	5,742	E1	3.6	6,460	M	3.3	5,921	M
98362-DSHWM-MARIN	Nippon Paper Industries USA Co. Ltd.	Port Angeles, WA	0.034969	8,367	M2	0.03689	66	M2	NR	NR	NR	0.92	1,650	M	1.82	3,266	M
71611-NTRNT-FAIRF	Evergreen Packaging	Pine Bluff, AR	3.2139	5,684	O	3.3431	49	O	3.4	6,101	O	3.7	6,640	O	3.6	6,459	O
18629-PRCTR-ROUTE	Procter & Gamble Paper Products Co	Mehoopany, PA	0.020003	4,517	E1	0.018	32	E1	0.02	29	E1	0.087	156	E	0.012	22	C

Table 20-16. Dioxin and Dioxin-Like Discharges From Pulp and Paper Category Reported to TRI in 2004–2009

			2009			2008			2007			2005			2004		
TRI ID	Facility Name	Location	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
36545-BSCSC-307WE	Boise White Paper LLC	Jackson, AL	2.2812	4,032	E1	2.3119	34	E1	2.21	3,965	E1	2.1	3,770	E	2.1	3,768	E
36732-GLFST-HIGHW	Rock-Tenn Mill Co LLC	Demopolis, AL	2.1694	3,838	E1	1.9993	29	E1	1.84	3,301	E1	0.292	524	E	0.32	575	E
28456-FDRLP-RIEGE	International Paper Riegelwood Mill	Riegelwood, NC	0.0663	3,507	E1	0.0304881	55	E1	0.0304	54	E1	0.0304	55	E	0.0305	55	E
71654-PTLTC-HIGHW	Clearwater Paper Corp, Arkansas City	Arkansas City, AR	0.456	3,222	O	0.984	1,766	O	NR	NR	NR	0.204	365	O	0.97	1,737	O
28560-WYRHS-STREE	Weyerhaeuser	Vanceboro, NC	1.35604	2,715	E1	1.657323	24	E1	1.71	3,069	E1	1.7	3,050	E	1.74	3,119	E
32078-GRGPC-STATE	Georgia - Pacific Corp, Palatka	Palatka, FL	1.4041	2,483	E1	1.4	20	E1	NR	NR	NR	NR	NR	NR	NR	NR	NR
27962-WYRHS-TROWB	Domtar Paper Co Plymouth Mill	Plymouth, NC	3.4794	2,373	E1	4.2028	7,541	E1	4.33	7,777	E1	0.989	1,770	E	0.91	1,638	E
75504-NTRNT-POBOX	International Paper Texarkana Mill	Queen City, TX	1.552	1,752	M2	1.302	19	M2	2.68	4,809	M2	0.68	1,220	M	3.87	6,944	M
32533-CHMPN-375MU	International Paper Pensacola Mill	Cantonment, FL	2.309	1,568	E1	0.88	1,579	E1	NR	NR	NR	0.8	1,440	E	0.93	1,669	E
37662-MDPPR-POBOX	Weyerhaeuser Co Kingsport Paper Mill	Kingsport, TN	0.83272	1,473	E1	0.8617	1,546	O	NR	NR	NR	3.45	6,190	M	3.4	6,101	M
32347-BCKYC-ROUTE	Buckeye Florida Lp	Perry, FL	0.123152	1,141	M2	1.221887	18	M2	NR	NR	NR	1.32	2,380	M	1.3	2,330	M
63702-PRCTR-POBOX	Procter & Gamble Paper Products Co	Jackson, MO	0.005099	802	O	0.0051	0	O	0.004	8.8	O	0.0042	8	O	0.0051	9.2	O

Table 20-16. Dioxin and Dioxin-Like Discharges From Pulp and Paper Category Reported to TRI in 2004–2009

			2009			2008			2007			2005			2004		
TRI ID	Facility Name	Location	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
31521-BRNSW-14W9T	Brunswick Cellulose Inc	Brunswick, GA	0.2271	309	E1	0.218	391	E1	0.19	341	E1	0.186	335	E	0.19	335	E
29442-NTRNT-KAMIN	International Paper Georgetown Mill	Georgetown, SC	0.6383	214	C	0.683	1,225	C	NR	NR	NR	0.753	1,350	C	0.75	1,351	C
31545-TTRYN-SAVAN	Rayonier Performance Fibers, Jesup Mill	Jesup, GA	0.00023	191	O	0.0003	1	O	NR	NR	NR	NR	NR	NR	NR	NR	NR
70634-BSSTH-USHIG	Boise Packaging & Newsprint LLC	Deridder, LA	0.0893	156	E1	0.1455	261	E1	0.12	215	E1	0.19	341	E	0.22	395	E
3676W-NTRNT-76HIG	International Paper, Pine Hill Mill	Pine Hill, AL	3.0065	116	E1	3.02814	44	E2	NR	NR	NR	NR	NR	NR	NR	NR	NR
49829-MDPBL-COUNT	Escanaba Paper Co.	Escanaba, MI	0.890943	85	M2	5.612	81	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
54308-THPRC-501EA	Procter & Gamble Paper Products Co	Green Bay, WI	0.000300	83	C	0.0006	0	C	0.0008	1	C	0.0003	1	C	0.0005	0.9	C
17362-PHGLT-228SO	P. H. Glatfelter Co Spring Grove Mill	Spring Grove, PA	1.0633	70	E1	1.105	1,983	E1	1.02	1,830	E1	0.946	1,700	E	0.9	1.616	E
12883-NTRNT-SHORE	International Paper	Ticonderoga, NY	0.4166	62	M2	0.4223	758	M2	0.44	790	M2	0.46	826	E	0.46	834	E
36426-CNTNR-HIGHW	Smurfit-Stone Container Enterprises Inc	Brewton, AL	3.0053	44	M2	3.0053	44	M2	NR	NR	NR	NR	NR	NR	2.5	4,486	E
18653-PPTLB-MAINS	Cascades Tissue Group PA Inc, Ransom Mill	Ransom, PA	0.0179	32	C	0.0153	27	C	0.0179	32	C	NR	NR	NR	NR	NR	NR
29704-BWTRC-5300C	Bowater Coated & Specialty Papers Div	Catawba, SC	2.161	31	M2	1.9695	29	C	NR	NR	NR	NR	NR	NR	NR	NR	NR
31407-STNCN-1BONN	Weyerhaeuser Port Wentworth	Port Wentworth, GA	1.273	18	E1	1.3648	2,449	E1	0.61	1,094	E1	0.679	1,220	E	0.69	1,239	E

Table 20-16. Dioxin and Dioxin-Like Discharges From Pulp and Paper Category Reported to TRI in 2004–2009

TRI ID	Facility Name	Location	2009			2008			2007			2005			2004		
			Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
29044-NNCMP-ROUTE	International Paper	Eastover, SC	0.119	2	M2	0.1077	193	M2	NR	NR	NR	0.183	328	O	0.16	282	O
54474-WYRHS-200GR	Weyerhaeuser	Rothschild, WI	0.063972	1	M2	0.0633	114	M2	NR	NR	NR	0.042	75	M	0.048	86	M
98607-JMSRV-NE4TH	Fort James Camas LLC	Camas, WA	0.0025	0.2311	E1	0.0034	6	M2	NR	NR	NR	NR	NR	NR	NR	NR	NR
70791-GRGPC-ZACHA	Georgia-Pacific Consumer Products LLC	Zachary, LA	0.00163	0.0237	M2	10	2,337	E1	2.77	4,974	E1	2.77	4,970	E	2.77	4,974	E
31068-BCKYC-OLDST	Weyerhaeuser Co	Oglethorpe, GA	0.0011	0.0160	O	0.001	2	O	0.001	1.79	O	0.001	2	O	0.0005	0.9	O
Indirect																	
07407-MRCLP-1MARK	Marcal Paper Mills Inc.	Elmwood Park, NJ	0.379098	1,273	M2	0.1699	2.468	M2	0.16	1,315	M2	0.02499	45	M	0.00799	14	M
29681-WRGRC-803NO	Sealed Air Corp, Cryovac Div.	Simpsonville, SC	0.011185	989	O	NR	NR	NR	0.0187	1,654	O	NR	NR	NR	NR	NR	NR
32401-STNCN-1EVER	Smurfit-Stone Container Corp	Panama City, FL	0.074799	256	E1	NR	NR	NR	0.082	146	E1	0.0782	140	E	0.078	140	E
54308-THPRC-501EA	Procter & Gamble Paper Products Co	Green Bay, WI	0.000850	234	C	NR	NR	NR	0.00081	0.997	C	0.00034	1	C	0.00051	0.9	C
31702-THPRC-USROU	Procter & Gamble Paper Pro Ducts Co	Albany, GA	0.000663	111	O	NR	NR	NR	0.001	109	O	0.001989	4	O	0.0036	6.4	O
55744-BLNDN-115SW	Upm Blandin Paper Co	Grand Rapids, MN	2.19	59.33	E2	2.379	175.7	E2	2.11	3,782	E1	2.261	4,060	M	2	3,599	M
93030-PRCTR-800NO	Procter & Gamble Paper Products Co	Oxnard, CA	0.000134	20.27	C	NR	NR	NR	0.00016	0.45	C	0.0000214	0	C	0.0034	6.1	C
23860-STNHP-910IN	Smurfit-Stone Container Corp	Hopewell, VA	0.000045	1.239	C	NR	NR	NR	0.221	397	C	0.21	378	O	NR	NR	NR

Table 20-16. Dioxin and Dioxin-Like Discharges From Pulp and Paper Category Reported to TRI in 2004–2009

TRI ID	Facility Name	Location	2009			2008			2007			2005			2004		
			Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate	Grams Released	TWPE	Basis of Estimate
55720-PTLTC-NORTH	Sappi Cloquet LLC	Cloquet, MN	0.04131	0.5998	M2	NR	NR	NR	0.04	78	M2	0.04811	86	E	0.044	78	E
63702-PRCTR-POBOX	Proctor & Gamble Paper Products Co	Jackson, MO	0.000000238	0.027	E1	NR	NR	NR	0.00392	9	O	NR	NR	NR	NR	NR	NR

Sources: TRIReleases2009_v2; TRIReleases2008_v3; TRIReleases2007_v2; TRIReleases2005_v2; and TRIReleases2004_v3.

NR: Not reported.

For indirect discharges, the mass shown is the mass transferred to the POTW that is ultimately discharged to surface waters, accounting for an estimated 83 percent removal of dioxin and dioxin-like compounds by the POTW.

The TWPEs in this table were calculated using the 2006 TWFs (the 2006 dioxin and dioxin-like compound TWFs did not change from the August or December 2004 TWFs).

Refineries reported basis of estimate in TRI as: M (monitoring data/measurements), M2 (periodic monitoring data/measurements), C (mass balance calculations), E (published emission factors), and O (other approaches, such as engineering calculation).

21. TIMBER PRODUCTS PROCESSING (40 CFR PART 429)

EPA selected the Timber Products Processing (Timber Products) Category for preliminary review because it ranks high, in terms of toxic-weighted pound equivalents (TWPE), in the point source category rankings. EPA reviewed discharges from the Timber Products Category as part of the 2004 Annual Reviews (U.S. EPA, 2004). This section summarizes the results of the 2011 Annual Reviews associated with the Timber Products Category. EPA focused on discharges of copper from discharge monitoring reports (DMR) and dioxin and dioxin-like compounds from the Toxics Release Inventory (TRI) because of their high TWPE relative to the other pollutants in the Timber Products Category.

21.1 Timber Products Category 2011 Toxicity Rankings Analysis

Table 21-1 compares the toxicity rankings analysis review results for the Timber Products Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the DMR and TRI databases increased from discharge year 2002 to 2008 and decreased from 2008 to 2009. The 2009 DMR TWPE accounts for approximately 75 percent of the combined 2009 DMR and TRI TWPE.

Table 21-1. Timber Products Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Timber Products Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	48,000	1,100	49,100
2004	2007	63,900	443	64,300
2005	2008	51,500	NA	NA
2007	2009	16,300	51,600	67,900
2008	2010	27,300	295,000	322,000
2009	2011	29,700	91,200	121,000

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v3; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

21.2 Timber Products Category Pollutants of Concern

Table 21-2 lists the top five pollutants with the highest TWPE in the 2009 and 2008 DMR databases, based on results from the 2011 and 2010 Annual Reviews (*DMRLoads2009_v2* and *DMRLoads2008_v3,* respectively). Copper is the top DMR-reported pollutant in 2009, contributing more than 87 percent of the 2009 DMR TWPE. EPA did not investigate the other top DMR pollutants as part of the 2011 Annual Reviews because they represent less than 13 percent of the 2009 DMR TWPE for the Timber Products Category.

Table 21-2. Timber Products Category Top DMR Pollutants

Pollutant	2008 DMR Data[a]			2009 DMR Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Copper	1	24	267,000	1	16	79,700
Iron	Pollutant not reported in the top five 2009 DMR reported pollutants.			2	4	7,930
Manganese				3	2	886
Ammonia as N				4	17	768
Magnesium				5	4	371
Arsenic	2	13	9,670	Pollutant not reported in the top five 2009 DMR reported pollutants.		
p-Chloro-m-cresol	3	2	2,970			
Benzo(a)pyrene	4	4	2,930			
Pentachlorophenol	5	7	2,590			
Timber Processing Category Total	**NA**	**66** [b]	**295,000**	**NA**	**55** [b]	**91,200**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.
[a] DMR data include major and minor dischargers.
[b] Number of facilities reporting a TWPE of greater than zero.
NA: Not applicable.

Table 21-3 lists the five pollutants with the highest TWPE in the 2009 and 2008 TRI databases (*TRIReleases2009_v2* and *TRIReleases2008_v3*, respectively). Dioxin and dioxin-like compounds are the top TRI-reported pollutant in 2009, contributing more than 72 percent of the 2009 TRI TWPE. EPA did not investigate the other top TRI pollutants as part of the 2011 Annual Reviews because they represent less than 28 percent of the 2009 TRI TWPE for the Timber Products Category.

Table 21-3. Timber Products Category Top TRI Chemicals

Pollutant	2008 TRI Data[a]			2009 TRI Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Dioxin and dioxin-like Compounds	1	19	17,000	1	20	21,500
Arsenic and arsenic-like Compounds	2	18	4,810	2	18	2,830
Polycyclic aromatic compounds	Pollutants not reported in the top five 2009 TRI-reported pollutants.			3	33	1,410
Creosote	3	9	2,350	4	3	1,020
Copper and copper compounds	4	31	1,240	5	24	1,000
Pentachlorophenol	5	15	705	Pollutants not reported in the top five 2008 TRI-reported pollutants.		

Table 21-3. Timber Products Category Top TRI Chemicals

Pollutant	2008 TRI Data[a]			2009 TRI Data[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Timber Processing Category Total	**NA**	**122[b]**	**27,300**	**NA**	**101[b]**	**29,700**

Sources: *TRIReleases2009_v2* and *TRIReleases2008_v3*.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] Number of facilities reporting TWPE greater than zero.

NA: Not applicable.

21.3 Timber Products Category Copper Discharges in DMR

Table 21-4 presents the top facilities with copper discharges in the 2009 DMR database. EPA focused its review of copper discharges on the Ed Arey & Sons, Inc., facility in Buckhannon, WV. The facility accounts for more than 99 percent of the copper discharges in the 2009 DMR data. The remaining 15 timber products facilities with copper discharges account for less than 1 percent of the total Timber Products 2009 DMR copper TWPE.

Table 21-4. Top Copper Discharging Facilities in the 2009 DMR Database

Facility Name	Pounds of Copper Discharged	Copper TWPE	Percentage of Timber Products Category's 2009 DMR Copper TWPE
Ed Arey & Sons Inc.	126,000	79,400	>99%
All other copper dischargers in the Timber Products Category[a]	561	353	<1%
Total	**127,000**	**79,800**	**100%**

Source: DMRLoads2009_v2.

[a] There are 15 remaining facilities that have copper dischargers in the 2009 DMR database, which account for less than 1 percent of the category's copper DMR TWPE.

Ed Arey discharges copper through three outfalls, 001, 002, and 003. Table 21-5 presents Ed Arey's copper concentration and flow discharge data from the 2009 DMR database. EPA compared the 2009 DMR concentration and flow data to 2008 and 2009 flow data from Envirofacts. The 2008 October flows in Envirofacts show an error with the unit of measurement for the flows at all of the facility's outfalls; the flows in the 2009 DMR database were 1,000,000 times higher than 2008 flow data values in Envirofacts. Using the corrected flows, Ed Arey's copper discharges are 0.1 pounds and 0.06 TWPE for 2009, reducing the facility's total TWPE by 99 percent. This reduction in TWPE decreases the Timber Products Category's 2009 DMR TWPE by 79,400.

Table 21-5. Ed Arey's 2009 DMR Copper and Flow Discharge Data

Outfall	Monitoring Period Date	Maximum Concentration (mg/L)	DMR Loadings Tool Flow (MGD)	Corrected Flow (MGD)
001	30-Apr-2009	0.25	235	0.000235
001	31-Oct-2009	0.01	160	0.00016
002	30-Apr-2009	0.02	215	0.000215
002	31-Oct-2009	0.02	140	0.00014
003	30-Apr-2009	0.02	245	0.000245
003	31-Oct-2009	0.06	180	0.00018

Sources: EPA's Envirofacts and DMR Loadings Tool.

21.4 Timber Products Category Dioxin and Dioxin-Like Compounds Discharges in TRI

As part of the 2011 Annual Reviews, EPA contacted the trade association for timber products facilities, the Treated Wood Council, and the trade association for pentachlorophenol manufacturers, the Pentachlorophenol Task Force (PTF), to confirm the dioxin discharges and distributions reported in the 2009 TRI database. EPA had previously contacted the Treated Wood Council to collect information on dioxin and dioxin-like compound discharges as part of the 2004 Annual Reviews; in 2004, the Treated Wood Council identified the source of the dioxin and dioxin-like discharges as the pentachlorophenol used in the wood preservation process (U.S. EPA, 2004). The PTF confirmed that the top reporting facilities are still using pentachlorophenol in their processes. The PTF reported that some facilities have dioxin and dioxin-like compound discharges due to groundwater remediation activities; however, the majority of the reported releases are associated with stormwater runoff from the finished-products storage yards (Wilkinson, 2011).

The PTF also provided information on all 20 Timber Products dioxin and dioxin-like compound discharging facilities. Table 21-6 presents the timber products facilities with dioxin and dioxin-like compound discharges in the 2009 TRI database and the resulting changes made to the pounds and TWPE as a result of the PTF information (Wilkinson, 2011).

The Treated Wood Council provides TRI industry reporting guidance, including a congener distribution, to the timber facilities to properly estimate dioxin and dioxin-like compound discharges from their facility. These estimates are based on pentachlorophenol composition, which as a result of manufacturing can include dioxin and dioxin-like compounds. The Treated Wood Council indicated that the TRI reporting guidance was updated based on 2008 pentachlorophenol composition data. Facilities then estimate or measure effluent pentachlorophenol and use the congener distribution from the pentachlorophenol sampling to calculate the dioxin and dioxin-like compound discharges. The PTF recognizes that this may be a conservative approach given that the water solubility for pentachlorophenol is many orders of magnitude higher than the water solubility of dioxin and dioxin-like compounds (Wilkinson, 2011).

Table 21-6. Dioxin and Dioxin-Like Compounds Discharging Facilities in the 2009 TRI Database

Facility Name	Location	Pounds of Dioxin and Dioxin-Like Compounds Released[a]	Dioxin and Dioxin-Like Compounds TWPE	Revised Dioxin and Dioxin-Like Compounds TWPE	Summary of Change from Pentachlorophenol Task Force
Electric Mills Wood Preserving LLC	Scooba, MS	0.130	8,230	1,530	Facility determined that an error had been made during computation of releases. The stormwater discharge from a 28-acre drainage area was counted twice and there was a data entry error. Amended 2009 TRI data show a release of 0.024 pounds. Accordingly, EPA revised the pounds and TWPE.
Cahaba Pressure Treated Forest Products Inc	Brierfield, AL	0.060	3,760	3,760	No change.
Huxford Pole & Timber Co Inc	Huxford, AL	0.037	2,320	2,320	No change.
Baldwin Pole Mississippi	Wiggins, MS	0.029	1,860	1,860	No change.
Koppers Inc	Grenada, MS	0.025	1,620	1,620	No change.
William C Meredith Co Inc	East Point, GA	0.022	1,400	1,400	No change.
Colfax Treating Co LLC	Pineville, LA	0.011	714	714	No change.
T R Miller Mill Co Inc	Brewton, AL	0.009	607	607	No change.
Koppers Inc	Florence, SC	0.011	553	553	No change.
Louisiana-Pacific Corp	Roaring River, NC	0.00002	285	0	Facility’s TRI-reported releases are based on a one-time analysis for chlorinated dioxins/furans required by the facility’s NPDES permit. The results were all below the detection limits and the facility used half the detection limit to report releases. Accordingly, EPA zeroed the dioxin pounds and TWPE.
Baldwin Pole & Piling Co Inc	Bay Minette, AL	0.001	80.1	80.1	No change.
Mcfarland Cascade Pole & Lumber Co	Tacoma, WA	0.0005	27.8	27.8	No change.
Mcfarland Cascade Pole & Lumber Co	Eugene, OR	0.0004	24.9	0	Facility performed analyses for chlorinated dioxins/furans in 2009, for which the all results were non-detect. Accordingly, EPA zeroed the dioxin pounds and TWPE.

Table 21-6. Dioxin and Dioxin-Like Compounds Discharging Facilities in the 2009 TRI Database

Facility Name	Location	Pounds of Dioxin and Dioxin-Like Compounds Released[a]	Dioxin and Dioxin-Like Compounds TWPE	Revised Dioxin and Dioxin-Like Compounds TWPE	Summary of Change from Pentachlorophenol Task Force
Bell Lumber & Pole Co	New Brighton, MN	0.0001	4.52	4.52	No change.
Brooks Manufacturing Co	Bellingham, WA	0.0001	3.82	3.82	No change.
Craftmaster Manufacturing Inc	Wysox, PA	0.0000002	3.45	3.45	No change.
J H Baxter & Co	Eugene, OR	0.00007	1.95	1.95	No change.
Oeser Co	Bellingham, WA	0.00005	1.54	1.54	No change.
Atlantic Wood Industries Inc	Vidalia, GA	0.00005	1.54	1.54	No change.
Permapost Products Inc	Hillsboro, OR	0.00001	0.16	0.16	No change.
Total		**0.338**	**21,500**	**14,500**	**NA**

Sources: *TRIReleases2009_v2*, the Pentachlorophenol Task Force letter (Wilkinson, 2011), 2011 Timber Data Review and Revised Calculations, (ERG, 2011).

[a] Discharges include transfers to POTWs and account for POTW removals.

NA: Not applicable.

21.5 Timber Products Category Conclusions

The estimated toxicity of the Timber Products Category discharges results mainly from the copper discharges in DMR from one plant (accounting for 87 percent of the category's 2009 DMR TWPE) and dioxin and dioxin-like compound discharges in TRI (accounting for 72 percent of the category's 2009 TRI TWPE). EPA concludes the following:

- EPA identified database errors for the flows from Ed Arey & Sons, Inc. With these errors corrected, the Timber Products Category's 2009 copper DMR TWPE decreased by 99 percent, from 79,700 to 300.

- EPA contacted the Treated Wood Council and PTF to confirm discharges of dioxin and dioxin-like compounds from timber products facilities. The PTF identified reporting errors for three of these dischargers (Wilkinson, 2011). With these errors corrected, the Timber Products Category's 2009 dioxin and dioxin-like compounds TRI TWPE decreased by 32 percent, from 21,500 to 14,500.

- The PTF stated that the industry reporting guidance for dioxin and dioxin-like compounds is based on the amount of pentachlorophenol measured or estimated in the wastewater and the dioxin and dioxin-like compound distribution in the pentachlorophenol. Additionally, all the wood preserving facilities are using the industry TRI reporting guidance to estimate releases, the majority of which are from stormwater runoff from finished-products storage yards (Wilkinson, 2011). EPA does not recommend revising the Timber Products effluent limitations guidelines (ELGs) because the dioxin and dioxin-like compound discharges are dominated by stormwater, which the ELGs do not cover.

- The Timber Products Category's 2009 combined TWPE after incorporating database corrections would be 34,600. This change would drop the category outside the top 95 percent that EPA prioritized for preliminary review as part of the 2011 Annual Reviews.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, EPA is assigning this category a lower priority for revision (i.e., it is marked with "(3)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

21.6 Timber Products Category References

1. ERG. 2011. Eastern Research Group, Inc. Preliminary Category Review—Facility Data and Revised Calculations for Ed Arey & Sons, Inc. (April). EPA-HQ-OW-2010-0824. DCN 07511.

2. U.S. EPA. 2004. *Technical Support Document for the 2004 Effluent Guidelines Program Plan*. Washington, D.C. (August). EPA-821-R-04-014. EPA-HQ-OW-2003-0074-1346 through 1352.

3. U.S. EPA, 2013. Preliminary 2012 Effluent Guidelines Program Plan. Washington, DC. (May). EPA-HQ-OW-2010-0824 DCN 07684.

4. Wilkinson, John. 2011. Letter Between John Wilkinson, Pentachlorophenol Task Force, and Jessica Gray, Eastern Research Group, Inc., Re: Timber Products Sector 2009 TRI: Chlorinated Dioxin/Furan Reporting. (July 22). EPA-HQ-OW-2010-0824. DCN 07512.

22. TEXTILE MILLS (40 CFR PART 410)

The Textile Mills (Textiles) Category continues to rank high, in terms of toxic-weighted pound equivalents (TWPE), in the point source category rankings. This industry was reviewed previously in EPA's Preliminary and Final 2006 Effluent Guidelines Program Plans and the Preliminary 2008 Effluent Guidelines Program Plan (U.S. EPA, 2005, 2006, 2007). This section summarizes the 2011 Annual Reviews associated with the Textiles Category. EPA focused on discharges of sulfide because of its high TWPE relative to the other pollutants in the Textiles Category.

22.1 Textiles Category 2011 Toxicity Rankings Analysis

Table 22-1 compares the toxicity rankings analysis results for the Textiles Category from the 2006 through 2011 Annual Reviews. The combined TWPE from discharges in the discharge monitoring reports (DMR) and Toxics Release Inventory (TRI) databases increased from discharge years 2007 to 2008 and decreased from discharge years 2008 to 2009. The estimated 2009 DMR TWPE accounts for approximately 95 percent of the combined 2009 DMR and TRI TWPE, similar to previous years.

Table 22-1. Textiles Category TRI and DMR Discharges for the 2006 Through 2011 Toxicity Rankings Analysis

Year of Discharge	Year of Review	Textiles Category		
		TRI TWPE[a]	DMR TWPE[b]	Total TWPE
2002	2006	3,710	123,000	127,000
2004	2007	3,040	123,000	126,000
2005	2008	3,040	NA	NA
2007	2009	2,390	79,900	82,300
2008	2010	2,750	247,000	250,000
2009	2011	1,910	37,200	39,100

Sources: TRIReleases2002_v4; PCSLoads2002_v4; TRIReleases2004_v3; PCSLoads2004_v3; TRIReleases2005_v2; TRIReleases2007_v2; DMRLoads2007_v4; TRIReleases2008_v3; DMRLoads2008_v2; TRIReleases2009_v2; and DMRLoads2009_v2.

[a] Discharges include transfers to POTWs and account for POTW removals.

[b] DMR data from 2002 through 2007 include only major dischargers. 2008 and 2009 DMR data include both minor and major dischargers.

NA: Not applicable. EPA did not evaluate DMR data for 2005.

22.2 Textiles Category Pollutants of Concern

The Textiles Category review focused on the 2009 DMR discharges because the 2009 DMR data dominate the category's combined TWPE. Table 22-2 lists the five pollutants with the highest TWPE based on results from the 2011 and 2010 DMR databases (*DMRLoads2008_v2* and *DMRLoads2009_v2*, respectively). Sulfide is the top DMR pollutant in discharge year 2009, contributing approximately 88 percent of the category's 2009 combined TWPE. Accordingly, the rest of the Textiles Category review focuses on the sulfide discharges from the 2009 DMR database.

Table 22-2. Textiles Category Top DMR Pollutants

Pollutant	2008[a]			2009[a]		
	Rank	Number of Facilities Reporting Pollutant	TWPE	Rank	Number of Facilities Reporting Pollutant	TWPE
Sulfide	4	25	30,100	1	18	34,500
Hydrogen sulfide	Pollutant not reported in the top five 2008 DMR-reported pollutants.			2	1	2,020
Chlorine				2	14	269
Copper				4	11	134
Ammonia as N				5	34	77.8
Mercury	1	3	135,000	Pollutant not reported in the top five 2009 DMR-reported pollutants.		
Aluminum	2	3	34,300			
Toxaphene	3	1	32,800			
Aldrin	5	1	9,500			
Textiles Category Total	**NA**	**77[b]**	**247,000**	**NA**	**56[b]**	**37,200**

Sources: DMRLoads2008_v3 and DMRLoads2009_v2.

[a] DMR data include major and minor dischargers.

[b] Number of facilities reporting a TWPE of greater than zero.

NA: Not applicable.

22.3 Textiles Category Sulfide Discharges in DMR

Table 22-3 presents the top sulfide dischargers in the 2009 DMR database. The majority (61 percent) of the sulfide discharges were from the top two discharging facilities, Mohawk Industries, Inc., in Lyerly, GA and Gold Mills, Inc. in Pine Grove, PA. Accordingly, EPA focused the Textiles Category review on these two facilities.

Table 22-3. Textiles Category Top Sulfide Discharging Facilities in the 2009 DMR Database

Facility Name	Facility Location	Pounds of Sulfide Discharged	Sulfide TWPE	Percentage of Textiles Category 2009 DMR Sulfide TWPE
Mohawk Industries, Inc.	Lyerly, GA	4,990	14,000	40.6%
Gold Mills, Inc.	Pine Grove, PA	2,490	6,980	20.2%
Remaining facilities reporting sulfide discharges in the Textiles Category[a]		5,120	13,500	39.2%
Total		**12,600**	**34,500**	**100%**

Source: DMRLoads2009_v2.

[a] There are 15 remaining facilities that have sulfide discharges in the 2009 DMR database, which account for approximately 40 percent of the category's sulfide DMR TWPE.

Sulfide is an anion of sulfur in its lowest oxidation state of minus 2 (S^{2-}). The dianion S^{2-} exists only in strongly alkaline aqueous solutions. Such solutions can form by dissolution of H_2S or alkali metals such as lithium sulfide, sodium sulfide, and potassium sulfide in the presence of excess hydroxide ions. The ion S^{2-} is exceptionally basic with an acid dissociation constant (pK_a) greater than 14. Sulfide does not exist in appreciable concentrations even in highly alkaline water. Instead, sulfide combines with protons to form HS^-, which is variously called H_2S ion. At still lower pH values (<7), HS^- converts to H_2S, as shown by the equation below. At a pH of 5, nearly 100 percent of sulfide is present as H_2S.

$$H_2S \Leftrightarrow HS^- + H^+ \text{ and } HS^- \Leftrightarrow S^- + H^+ \qquad \text{(Eq. 22-1)}$$

Sulfides are moderately strong reducing agents. They react with oxygen in the air in elevated temperatures to form higher-valence sulfur salts, such as sulfates and sulfur dioxide. Aqueous solutions of transition metals cations react with sulfides to precipitate solid metal sulfide salts. The metal sulfide salts typically have very low solubility in water.

Organic sulfur and sulfides are in the wastewater of textile mills mainly from the dying operation (U.S. EPA, 1974). In the 2009 DMR database, 17 facilities report sulfide discharges. EPA evaluated the monthly sulfide concentrations for all those reported above the detection limit and determined the average and median sulfide concentrations to be 1.36 and 0.35 mg/L, respectively. The sulfide concentrations range from below the detection limit to 26 mg/L.

Sulfides discharged to neutral receiving waters can be reduced to hydrogen disulfide (H_2S), an extremely toxic, odiferous, and corrosive gas. Minute concentrations (2 µg/L) of H_2S impart an objectionable odor and taste to water, making it unfit for municipal consumption (U.S. EPA, 1974). The National Water Quality Criteria also determined that sulfide concentrations greater than 2 µg/L would constitute a long-term hazard for fish and other aquatic life (U.S. EPA, 1986). Because of the proven toxicity of sulfides, sulfide was listed as a primary pollutant for BPT in the *Development Document for Effluent Guidelines and New Source Performance Standards for the Textile Mills Point Source Category* (1974 TDD).

Table 22-4 presents available sulfide treatment options in the textiles industry (see Section 19.5 for more details). Although these treatment options can remove sulfide from wastewater, the actual effluent concentrations attainable are a function of treatment system design (Briggs, 2011).

Table 22-4. Sulfide Wastewater Treatment Options

Technology Name	Treatability Concentrations	Description
Biological treatment	Up to 99 percent sulfide removal	Treats industrial effluent streams by either aerobic or anaerobic processes. The treatment involves bacteria decomposing waste to form harmless inorganic solids. Studies show that approximately 99 percent of the influent sulfide concentration can be biologically oxidized to sulfate.
Aeration and air stripping	Up to 100 percent sulfide removal	Aeration involves removal of dissolved gasses such as H_2S from water, and is generally used in two types of water applications: air stripping and aeration. The effectiveness of aeration for removing sulfide depends on the aeration method selected, the pH of the water, design factors, flow and loading rate, available area of mass transfer, temperature, and algae production. The major drawback to aeration is that H_2S is not destroyed but converted to an air emission.
Hydrogen peroxide oxidation	Up to 100 percent sulfide removal	This process controls sulfide by oxidation to either elemental sulfur or sulfate ion by hydrogen peroxide (H_2O_2) addition, depending on the pH of the wastewater. It can approach 100% efficiency if H_2O_2 is added in a controlled fashion and the reaction medium is thoroughly mixed. No additional wastewater processing is required following peroxide oxidation because sulfate is very soluble in water.

Sources: ERG sulfide treatment technologies memo (Briggs, 2011); "Biological Treatment of Tannery Wastewater" article (Durai and Rajasimman, 2010).

22.3.1 Mohawk Industries, Inc.

Sulfide discharges from Mohawk Industries, Inc., in Lyerly, GA account for approximately 18 percent of the DMR TWPE for the Textiles Category. All of Mohawk Industries' sulfide discharges are from its outfall 0A1. Table 22-5 presents the sulfide discharge quantities from DMR data. From these reported quantities, EPA calculated the sulfide concentrations for reporting years 2008 and 2009 using the average quantity and flow from the DMR Loadings Tool. As part of the 2010 Annual Reviews, EPA contacted Mohawk Industries and confirmed the 2008 sulfide quantities and that the permit limit for sulfide is 24.2 pounds per day (lb/day). Mohawk Industries also stated that sulfide in the wastewater may come from boiler treatment chemicals and wastewater treatment chemicals used to treat intake water for hardness (Wood, 2010).

The Textiles Category, Subpart F (Carpet Finishing) does regulate sulfide; however, it is a production-based limit of 0.08 pounds of sulfide per 1,000 pounds of product. Although the 2009 sulfide quantities are below the mass-based permit and calculated ELG limits, EPA's calculated sulfide concentrations, which range from 1.17 mg/L to 1.44 mg/L, are greater than treatability concentrations achieved by biological treatment, aeration and stripping, and hydrogen peroxide oxidation (up to 100 percent sulfide removal). The back-calculated concentrations are also greater than the Gold Book Water Quality Standards (2 μg/L) for sulfides (H_2S).

As part of the 2011 review, EPA contacted the facility permit writer with the Georgia Environmental Protection Division to discuss sulfide discharges at the facility. The permit writer stated that the permit limits are based on the ELG production-based limits because Georgia does not have a water quality standard for sulfide. The permit writer stated that no further investigation of sulfide discharges has been done at this time (Noell, 2011). Therefore, EPA is considering facility-specific permitting support to address sulfide discharges at this facility.

Table 22-5. Mohawk Industries 2008 and 2009 Monthly Sulfide Discharge Data for Outfall 0A1

Pollutant	Monitoring Period Date	2008			2009		
		DMR Loadings Tool Average Quantity (lb/day)	Calculated Sulfide Concentrations (mg/L)	Average Flow (MGD)	DMR Loadings Tool Average Quantity (lb/day)	Calculated Sulfide Concentrations (mg/L)	Average Flow (MGD)
Sulfide	31-Jan	13.4	1.2	1.32	14.90	1.41	1.26
Sulfide	30-Apr	18.3	1.3	1.66	15.1	1.44	1.26
Sulfide	31-Jul	16.8	1.9	1.03	10.7	1.17	1.1
Sulfide	31-Oct	6.24	1.1	0.723	13.4	1.33	1.21

Source: DMR Loadings Tool (http://cfpub.epa.gov/dmr/).

22.3.2 Gold Mills, Inc.

Gold Mills, Inc., in Pine Grove, PA discharges sulfide from its outfall 001, which receives wastewater from dyeing and finishing processes (PA DEP, 2004). Table 22-6 presents the 2009 sulfide discharge data in the DMR Loadings Tool and the calculated concentrations. EPA calculated the sulfide concentrations using the average quantity and flow provided in the DMR Loadings Tool.

For outfall 001, the facility permit average monthly sulfide limit is 15.8 lbs/day and the maximum daily limit is 31.6 lbs/day. The Textiles Category, Subpart E (Knit Fabric Finishing) does regulate sulfide; however, it is a production-based limit of 0.2 pounds of sulfide per 1,000 pounds of product. The sulfide quantities are 45 percent lower than the permit limits and do not exceed the calculated ELG mass-based limit; however, the calculated concentrations, which range from 2.43 to 3.03 mg/L, are greater than treatability concentrations achieved by biological treatment, aeration and stripping, and hydrogen peroxide oxidation (up to 100 percent sulfide removal). The back-calculated concentrations are also greater than the Gold Book Water Quality Standards (2 µg/L) for sulfides (H_2S).

As part of the 2011 review, EPA contacted the facility permit writer with the Pennsylvania Department of Environmental Protection to discuss sulfide discharges at the facility. The permit writer stated that the permit limits are based on the ELG production-based limits because Pennsylvania does not have a water quality standard for sulfide. The permit writer stated that sulfide discharges have not been investigated further at this time (Hastings, 2011). Therefore, EPA is considering facility-specific permitting support to address sulfide discharges at this facility.

Table 22-6. Gold Mills 2009 Monthly Sulfide Discharge Data

Outfall	Pollutant	Monitoring Period Date	DMR Loadings Tool Average Quantity (lb/day)	Calculated Sulfide Concentrations (mg/L)	Average Flow (MGD)
001	Sulfide	31-Jan-09	7.82	3.03	0.309
001	Sulfide	28-Feb-09	8.85	2.95	0.359
001	Sulfide	31-Mar-09	7.81	2.84	0.329
001	Sulfide	30-Apr-09	6.75	2.72	0.297
001	Sulfide	31-May-09	6.74	2.96	0.273
001	Sulfide	30-Jun-09	6.74	2.92	0.277
001	Sulfide	31-Jul-09	6.41	2.86	0.269
001	Sulfide	31-Aug-09	6.58	2.81	0.281
001	Sulfide	30-Sep-09	6.75	2.55	0.317
001	Sulfide	31-Oct-09	6.50	2.43	0.32
001	Sulfide	30-Nov-09	5.80	2.77	0.251
001	Sulfide	31-Dec-09	5.40	2.55	0.254

Source: DMR Loadings Tool (http://cfpub.epa.gov/dmr/).

22.4 Textiles Category Conclusions

The estimated toxicity of the Textiles Category discharges result mainly from sulfide discharges from two facilities. Data collected for the 2011 Annual Reviews demonstrated that wastewater discharge characteristics for this category are consistent with discharges from prior years. As in prior years, EPA concludes the following:

- Sulfides can be treated using biological treatment, aeration and stripping, and hydrogen peroxide oxidation. Air stripping is an effective treatment, but the H_2S is discharged to the atmosphere. Hydrogen peroxide oxidation and biological treatment are two efficient treatment technologies. Hydrogen peroxide oxidation at pH levels above 9.2 produces sulfate, but the pH must be raised to achieve treatment, then lowered to near neutral prior to surface discharge.

- Sulfide discharges from Mohawk Industries in Lyerly, GA and Gold Mills in Pine Grove, PA are both below the permit limit production-based quantities; however, the back-calculated concentrations for these facilities are higher than treatability levels using biological treatment in combination with air oxidation (using activated carbon) or hydrogen peroxide oxidation. These back-calculated concentrations are also above recommended national water quality criteria levels.

- Sulfide discharges in the Carpet Finishing and Knit Fabric subcategories result from the dyeing process. The Textiles 1974 TDD states that biological treatment is sufficient to treat sulfides in wastewater. More recent studies suggest that biological treatment in combination with air oxidation using activated carbon or hydrogen peroxide oxidation can completely eliminate sulfide from effluent wastewater. Because the facilities in this subcategory could reduce sulfide discharges via additional treatment or the use of sulfide-free dyes, EPA is considering facility-specific permitting support to control sulfide discharges.

EPA prioritizes point source categories with existing regulations for potential revision based on the greatest estimated toxicity to human health and the environment, measured as TWPE. Based on the above conclusions, this category is similar to the EPA "lower priority for revision" conclusion (i.e., this category is marked with "(2)" in the "Findings" column in Table 8-1 in the Preliminary 2012 Plan that presents the 2011 Annual Reviews of existing ELGs) (U.S. EPA, 2013).

22.5 Textiles Category References

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